



FRIDAY, JULY 15.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Meetings next week: Duluth, South Shore & Atlantic; Marquette, Houghton & Ontonagon.

Elections.—Carbon, Schuylkill & Western, John J. Summers, President.—Clearfield & Allegheny, John J. Summers, President.—Clearfield & Dubois, John E. Dubois, President.—Dayton & Michigan, Thomas J. Emery, President.—Hartford, Connecticut & Western, James W. Husted, President.—Mexican National, D. C. Dodge, General Manager.—New York, Chicago & St. Louis, James A. Roosevelt, President.—Pensacola & Memphis, L. H. Sellers, President.—Wabash Western, James F. How, Vice-President; Charles M. Hays, General Manager.

New Companies Organized.—Capay Valley files articles in California.—Clearfield & Allegheny obtains charter in Pennsylvania.—Carbon, Schuylkill & Western obtains charter in Pennsylvania.—Clearfield & Dubois obtains charter in Pennsylvania.—Chicago, Jefferson City, Girard & El Paso files charter in Kansas.—Denver, Russell Springs & Southwestern files articles in Kansas.—Desha & Eureka files articles in Arkansas.—Fort Scott, Wichita & Western files charter in Kansas.—Fort Plain & Richfield Springs is incorporated in New York.—Omaha, Dighton & Southwestern files articles in Kansas.—Richmond & St. Louis files articles in Indiana.—St. Paul, Mississippi, Faribault & Northwestern is incorporated in Minnesota.

Changes and Extensions.—*Arizona:* Maricopa & Phoenix completed to Phoenix.—*California:* San Francisco & North Pacific contracts for extension from Cloverdale to Ukiah.—*Colorado:* Trinidad Railroad is extended 5 miles.—*Georgia:* Macon & Covington is completed to Monticello.—*Indiana:* Huntington, Tell City & Cannelton has contracted for completion of line.—*Illinois:* Louisville & St. Louis will be built at once from Mount Vernon.—*Iowa:* Atchison, Topeka & Santa Fe will build branch to Keokuk.—*Kansas:* Chicago, Rock Island & Pacific completes extension to Wichita; Denver, Memphis & Atlantic extends lines 83 miles.—*Mississippi:* Pensacola & Memphis will begin construction from Grenada, Miss.—*Missouri:* Atchison, Topeka & Santa Fe will begin extension on Chicago extension this week.—*Mississippi:* Kansas City, Memphis & Birmingham will build 12-mile branch.—*Ohio:* Wheeling & Lake Erie will extend to Bowerston, O.—*Wisconsin:* Fairchild & Mississippi is completed from Fairchild to Osseo.

Leases and Sales.—Alexandria & Washington is sold.—St. Louis & San Francisco has purchased the Fort Smith & Southern.

Traffic.—Anthracite coal shipments for week ending July 9 show increase of 21.6 per cent. over corresponding week last year; bituminous shipments show decrease of 12.4 per cent. Coke, for week ending July 7, shows decrease of 57.1 per cent.—Cotton receipts, interior markets, for week ending July 8, show a decrease of 52.2 per cent. as compared with corresponding period last year; shipments show decrease of 59.1 per cent.—Seaport receipts show decrease of 11.2 per cent.; exports, a decrease of 53.9 per cent. Cotton in sight is less than at same date last year by 25.3 per cent.

Miscellaneous.—Chicago, Milwaukee & St. Paul begins suit against the Chicago, St. Paul, Minneapolis & Omaha for \$25,000,000.

Contributions.

Foot-Guards.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the course of investigations recently instituted for the purpose of deciding upon the best method of protecting yardmen's feet from the dangers of frogs and guard rails, I had occasion to look at some of the Massachusetts roads, and was surprised to find that the so-called foot-guard in use there is really a very shabby affair and one hardly worthy of the name. It appears that the law in that state makes the use of some sort of device compulsory, and I understand that the board of railroad commissioners approve of what the roads have done; but how they can regard the present appliances as anything more than a nominal compliance with the law is difficult to see. Light pine boards, not over 1 or 1½ inches thick, are tacked to the ties and superficially cover the space in which a man's foot might get caught; but with a rail 4 in. or more in height, the space between the board and the under side of the head of the rail is so great that a foot does not have to be extraordinarily perverse to get wedged in. It may be that casualties are largely prevented by this crude device, for in a majority of cases a person approaching would "stub his toe" against the end of the pine board and be put upon his guard; but to claim that much additional safety is secured to persons who accidentally step in that portion of an angle which is just wide enough to admit a shoe of their size is absurd.

MADISON.

[The Massachusetts commissioners in their last annual report print a letter from Superintendent Keeler, of the Flint & Pere Marquette, testifying to his satisfaction with the Hart guard; but they give no descrip-

tion of the devices used in their state. The time for the enforcement of the law had not then arrived (December, 1886), but the Boston & Albany, Fitchburg, Old Colony and Boston & Lowell had already put in some guards which the board says it had approved. Only one of the above roads has used the Hart guard, we believe, and that one only to a limited extent. While the Hart is not the only safe device, it is a fact that many of the blocks, straps and wedges used are shabbily made, hastily put down and carelessly maintained. Several of the larger roads in the state have so-called guards little if any better than those our correspondent describes, and one has not to go far on any one of a dozen Massachusetts roads to find frogs and switches very imperfectly protected and many not protected at all.—EDITOR RAILROAD GAZETTE.]

The Goliath Rail in the London and Paris Exhibitions.

LONDON, June 29, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Messrs. Cockerill have exhibited 100-pound rail in Paris at the Centennial, and I in London at the American Exhibition. I inclose a description of the former exhibit—the one in Paris—and have now to give you a short résumé of mine in London. The object being the introduction of heavier flange-rails for all countries, I have taken a stand and invited all makers in America, England, Belgium, Germany and France to send short pieces of their heaviest sections for exhibition, free of all patents and of all charges, and I am happy to say the stand is well provided. From America there are rails from Bethlehem Steel Works and Joliet, neither, however, approaching in weight anything like the Goliath. There are English rails from Barrow and West Cumberland, 90 lbs. to the yard; also rails weighing 80 lbs., from Rhymney and Abervale, in Wales; and there are some lighter ones from Germany; but, of course, the 100 lbs. Goliath is the prime rail of the stand. In fact all countries are represented, with a view to showing the different types of sections as well as the heaviest weights used, with the idea of promoting greater safety, economy and comfort.

I show also a railroad map of Sweden, showing the cost of construction of different roads proportionate to the speed they run at, and the weight of the rails they use, almost in direct ratio. * * *

C. P. SANDBERG.

[Mention was made of this chart and of some of the facts shown on it in the *Railroad Gazette* of June 3, 1887.—ED. RAILROAD GAZETTE.]

The Société Cockerill shows in the Paris Exhibition a 32-lb. iron rail, and beside it the 105-lb. Goliath. The former was rolled at Seraing in 1834, for the Brussels-Malines line, and the new rail is laid for trial at the identical point from which the old rail was taken. The line from Ostend to Arlon, over which certain of the Indian mail trains run, will be the first to get the benefit of the heavy rail. The Société Cockerill also shows a steel tie adapted to the Goliath rail, which, however, is laid now on creosoted oak ties.

Electro-Automatic Signals.

Pennsylvania Railroad Office,
HARRISBURG, Pa., June 27, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am sure every one interested in the subject of railroad signals read Mr. Blodgett's very clear article in your last issue with advantage to himself. The following points are, I think, worth bringing up: 1. Will Mr. Blodgett tell us what kind of track joint he uses to insulate the different rail sections? The wooden one commonly in use is objectionable from a trackman's standpoint. 2. The remarks about switch-boxes are only too true. It is certainly easier and safer to set the signal to danger by breaking the circuit than by making a short circuit. 3. I conclude from the sketch of the switch-box that the signal varies with the switch; that is, when the switch is set for main track the signals show clear, and when set for the siding, danger. This has caused trouble on this road, and the standard distant switch signal is now worked by a cam shaft distinct from the switch lever, so arranged that before the switch can be set for the siding the signal must be set to danger. This allows a conductor to do his drilling with his train protected, whether the switch is set for the main line or siding. 4. While the clockwork signal is I suppose generally admitted to be superior to the old style Hall signal, or to any automatic signal which does not work on the rail circuit system, I think that the electro-pneumatic signals of the Union Switch and Signal Co. are superior to any automatic signal in service anywhere. They include the overlapping feature, and the records of those in use on the Pennsylvania show no failures from freezing weather or snow holding the signal clear when it should show danger. They also have this advantage: being semaphores, it is possible to have the same form of signal throughout the road. There is much to be said on this very interesting subject. Cannot some of your readers who have had experience be induced to say it for the benefit of the rest?

S. P. HUTCHINSON.

BOSTON, July 8, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The wooden blocks for insulating track sections were abandoned by the Boston & Albany several years since, because they did not keep the rails well in place and were not durable. A trial of vulcanized fibre gave but little better results. Joints are now insulated by placing behind the iron

fish-plate a strip of "leatheroid" (made by the Leatheroid Manufacturing Co., of Kennebunk, Me.) ½ in. thick, and molded to fit the rail; the bolts are insulated from the rails by bushings of the same material, and a piece ¼ in. long of a size and shape just equal to the rail section is placed between the ends of two rails. The fish-plates are planed off to allow for the space taken up by the leatheroid strip. These joints hold the rails well and are very durable.

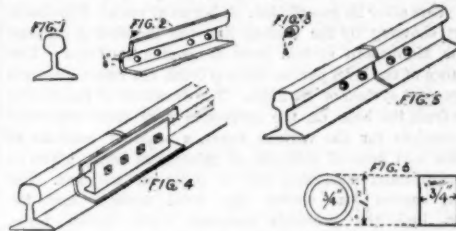


Fig. 1 shows the piece of leatheroid which separates one rail from another. Fig. 2 the piece which insulates the splice bar from the rail. Fig. 3 the piece which surrounds the bolt, and fig. 4 is an enlarged section of it. Fig. 5 shows a finished joint, and fig. 6 shows one before the splice bar is put in place.

It is not always sufficient to simply break the circuit in a switch-box, for the reason that if the current through the rails be strong and the insulations wet, enough electricity will sometimes leak through the end section at the insulated joint to hold the signal clear, even with a broken track circuit, but if the circuit be cut off at the switch, and a new one back to the battery be joined up (as in fig. 5a*), it never fails to set the signal to danger (provided, of course, that the signal itself be in good order).

The signal "varies with the switch" if nothing is in the section, but if any portion of a train is occupying it, the signal is held at danger, whatever be the position of the switch, so that a train is not left with a clear signal behind it (as Mr. Hutchinson seems to suppose) if the switch is sometimes replaced on the main line while shifting or yard work is going on. If the whole train enters the siding far enough to clear the main line, and the switch be then replaced the signal will go clear.

The electro-pneumatic semaphores to which he refers usually have precisely the same arrangement of track circuits, relays, etc., as the clockwork signals; the only difference between the two systems is in the form of signal and the motive power—one is moved by compressed air and gravity, the other by clockwork and a weight. The semaphores have certain advantages over the others, which are partly offset by the much greater first cost (usually about twice as much) and the cost of running the air-compressing apparatus. Where an engineer is already employed for other purposes, he may sometimes do this also without much additional expense, but if a man must be kept on duty solely for this purpose, it adds considerably to the cost of maintenance.

G. W. BLODGETT.

Rapid Transit for New York.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I put forward, during the spring, in a letter to the *Evening Post*, some views as to rapid transit in New York, which the *Sanitary Engineer*, in a recent article on the subject, criticises as to the figures for cost given by me, as too high. I believe the matter is of sufficient general interest to make my reply interesting to your readers.

The latter is, in brief, to build an elevated road along the main axis of Manhattan Island, at such a level as to allow the utilization of the ground below it for dwelling or business purposes; but not to occupy the streets, except so far as transverse bridging of them is concerned.

The *Sanitary Engineer* claims that my estimate of the cost of right of way (\$3,000,000 per mile) is too high, and says I cannot have examined the subject closely, to which I might with some propriety retort: "You're another;" inasmuch as no figures are given to prove the criticism. I will say, however, that 23 recent sales of property on or near the route proposed, ranging in locality from Liberty street to 124th street, but not covering any of the very expensive property in the Wall street neighborhood, which would have to be intersected, show an average cost, improved and unimproved, of \$10.48 per square foot. Allowing for station grounds, an average width of right of way not less than 60 ft. must be taken, which would give (after deducting the width of the streets) 244,800 sq. ft. per mile. This, at the above price, would cost \$2,565,500. Now it must be borne in mind that enormous additions would be caused by the necessary acquisition of occasional very valuable buildings. It must also be remembered that the right-of-way would be obtained throughout under much more unfavorable conditions than those under which land is ordinarily acquired in city transfers. Regard must be had, too, to the legal and other expenses caused by the opposition of the Manhattan Elevated, and \$3,000,000 per mile appears to me a fair estimate of the probable cost.

My critic does not state the foundation for his belief that an elevated road of solid character can be built for \$600,000 per mile, nor does he appear to have considered at all that my assumed cost was to cover reconstruction of buildings in many cases to adapt them for business purposes, in connection with their use as support for the proposed railroad, and to provide lifts at the stations and machinery for operating the same. The *Sanitary Engineer's* estimate of \$30,000,000 on his own basis would cover a road only 9.67 miles long, which in a bee line from the Battery, would reach only to the present terminus of the 9th Avenue Elevated, at the Harlem,—a length of route entirely inadequate to serve one of the

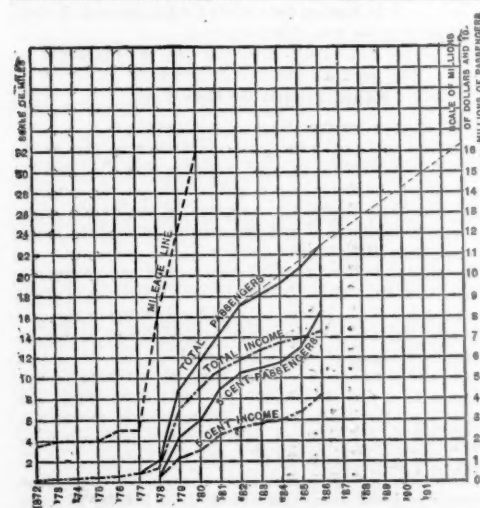
* *Railroad Gazette*, June 24.

chief objects of my scheme. This was the building up of the best part of the island for residence purposes—namely, the district lying along 10th avenue from about 150th street to the Harlem River.

To assume that the proposed road would carry seventy million passengers the first year, or somewhere between 50 and 60 per cent. of the whole present traffic on the four lines of the "Manhattan," appears to me a little extravagant, though the road would pretty certainly do this within a few years after its completion, if begun at once. I inclose a chart, showing by the broken line the increase of mileage of the Manhattan system from its opening until now. The distance of the level part at the top from the base represents the present system of 32 miles. The distances of the beaded lines from the base on the successive year lines represent the receipts for the various years, a scale of millions of dollars and tens of millions of passengers being given on the right-hand side, and one of miles on the left. The upper beaded line shows the total receipts and the lower line the amounts received from 5-cent fares. From this and the table given below, it will be seen that while the total receipts have increased from year to year in a decreasing ratio—that is the percentage of increase each year has decreased—the returns from 5-cent fares have gone on increasing on an average at a steady rate of over 25 per cent., the total increase from 1880, the first year of operation of the full system, to the end of 1885, being 128 per cent., while the annual receipts from 10-cent fares up to the end of the same year increased only 16 per cent.

MANHATTAN ELEVATED—MILEAGE AND RESULTS OF OPERATION.

Years	Miles	Total passengers	Total receipts	5-cent passengers in millions and decimals	10-cent passengers in millions and decimals	Receipts 5-cent traffic	Receipts 10-cent traffic
1872	3 1/4	137,446	\$13,744				
1873	4	614,025	64,602				
1874	4	796,072	81,047				
1875	4	920,571	91,631				
1876	5	2,012,953	202,475				
1877	5	3,011,862	301,238				
1878	16	8,291,319	779,353	2,200	0.296	\$149,779	\$628,574
1879	23	46,045,181	3,546,825	21,554	24.491	1,077,093	2,469,732
1880	32	60,830,757	4,612,975	29,404	31.428	1,470,200	3,142,775
1881	32	75,545,778	5,311,075	44,950	30.636	2,247,507	3,063,574
1882	32	86,361,029	5,973,633	53,249	33.112	2,662,470	3,311,163
1883	32	92,124,943	6,386,505	56,520	35.605	2,825,989	3,560,516
1884	32	96,702,620	6,726,359	58,878	37.825	2,943,903	3,782,456
1885	32	103,454,729	7,000,506	66,698	36.657	3,334,906	3,665,601
1886	32	113,109,591	7,426,216	61.693	33.416	4,084,743	3,341,474



It was observation of this fact probably more than any magnanimity or concession to public opinion which led the Manhattan to reduce the fare to 5 cents at all times; the results of which policy are seen in the astonishing increase of traffic of last year, and what will be undoubtedly the still more astonishing increase for this year; unless the inadequacy of the accommodation checks this.

The upper full line on the diagram shows the total number of passengers carried. This is plotted on a scale of 10 passengers to 1 dollar of receipts, and the line of course coincides with the income line up to 1878, when the 5-cent fares began. The lower full line represents the traffic on 5-cent fares, and here can be seen more clearly than in the income line the fact that the increase of traffic has been almost entirely in 5-cent fares, the 5-cent line running almost parallel with the total traffic line for the years '82 to '85 and then swinging up sharply toward it. The deduction to be drawn from this is that almost the entire increase of traffic on the road has come from the building up of the upper part of the island and the consequent addition to early and late traffic.

In order to get at the probable increase of traffic in the future I have drawn a straight line through the 1882 and 1886 points on the total traffic line, which prolonged, gives in 1891 a traffic of 150 million passengers. This, it will be observed, is not taking the present rate of increase nor the prospective rate with greater facilities, but the average from 1882 to 1886. I do not think it would be safe to estimate for the proposed road more than four-tenths of the total tra-

fic, which would give it in 1891 not less than 60 million passengers, and it is almost certain that it would get a good deal more from the travel induced by improved facilities and the building of the district served.

Returning to the *Sanitary Engineer* I would like to know why it assumes that the operating expenses would amount to only about 21 per cent. of the gross earnings. In spite of the permanent character of the structure proposed and the tremendous traffic, I do not feel that it would be safe to allow less than 50 per cent. for operating the road I propose, with its hand block-signals, lifts at stations and necessarily heavy renewal fund.

The *Sanitary Engineer* seems to forget in making up its estimate of traffic that the "Elevated" draws away from the surface roads already nearly all the traffic that can be got away, inasmuch as people now travel on the Elevated whenever they can do so without extra walking. The new road would therefore have to look for its custom mainly to the part of the present patrons of the Elevated for whom it would be equally convenient, supplemented by the dwellers in the new district served. In making up an estimate for the income of such a road in 1891, I should then take 60,000,000 passengers at 5c., or \$3,000,000 as the gross receipts from traffic. Allowing half of this as net receipts, we should have 1 1/2 million dollars.

My estimate for the cost of the road is given below. The cost of the structure, which includes remodeling the buildings on the line by the introduction of piers for the support of the road, is obtained by adding 15 per cent. to the cost of the Metropolitan District Railway in London, whose cost was itself very great, owing to its underground character and interference with foundations.

Cost of right of way per mile	\$3,000,000
of construction	1,030,000
Total cost per mile	\$4,030,000
Cost of whole road, 14.5 miles at \$4,030,000	\$16,443,000
Equipment	5,250,000
	\$21,693,000
Adding 12 1/2 per cent. for interest on capital during construction, superintendence and contingent	7,960,625
Total cost	\$29,653,625

In getting at the income on this capital it would be better to separate the income from real estate from the other. Allowing 3 1/2 per cent. on the real estate and 1 1/2 per cent. for taxes to be remitted on the same by the city, we have:

Income from real estate, 5 per cent. on \$43,500,000	\$2,175,000
Net income from traffic	1,500,000
Total income	\$3,675,000
Or 5.1 per cent. on the capital, without allowing anything for freight and mails carried, nor for newspaper and advertising privileges, and with what may certainly be considered ample figures for cost and small ones for traffic. A point in favor of the kind of elevated road I propose, at an average level of 70 feet above street surface, is the much less noisy character of the road both to passengers and abutters from the absence of reverberation from buildings.	

The equipment proposed provides for eight-car trains at one minute intervals on all four tracks, and will carry 40,000 passengers seated per hour on two of its tracks in the same direction. The plant proposed is therefore capable ultimately of transporting comfortably over 200,000,000 passengers per annum, allowing for the partially empty condition of trains at some hours, when run to accommodate the busy hours on the other tracks. It is obvious that when this condition of traffic was reached the road would be a handsome property, apart from the increase in rents on its real estate.

Here is a chance for some of the Vanderbilts, who are earning a reputation as benevolent and public-spirited citizens, to make at once a large and solid investment close at home, with a prospect of a continually increasing income, while at the same time conferring an inestimable benefit on their fellow citizens by bringing the dwellings in the suburban parts of the city into easy communication with the business centre. It has been suggested that such a scheme can only be carried out by getting the Manhattan owners to take hold of it. If that is waited for the road would never be built. The controlling spirits of the Manhattan are only energetic in appropriating the proceeds of other men's enterprise. I think it would be impossible to find a single one of their controlled enterprises which they themselves have initiated with a view to drawing an income from it in a legitimate commercial manner. On the other hand, there is no reason to believe that the proposed enterprise would fail, if taken up as a bona fide undertaking with plenty of capital to put it through, because roads like the original New York Elevated and the West Shore have failed and been gobbled up. The New York Elevated in the original hands failed because the owners were not well enough provided with capital or with faith to carry it through the doubtful stage of its existence. The West Shore failed because there was no just basis for building such a road in the face of four or five competitors for the through business and a powerful and well equipped competitor for every bit of local business that it tried for. Any number of well paying railroads in the country can be pointed out to-day which have been built on bona fide commercial enterprises and have never been boiled down and bought in by the manipulators who, some of our Wall street friends would persuade us, are the only people who can build a railroad successfully. W. HOWARD WHITE.

The Sault Ste. Marie Bridge.

As was announced in the *Railroad Gazette* of June 3, these bridges consist of ten 240-ft. spans over the St. Mary River, a swing bridge of 396 ft. over the present ship canal, a 220-ft. swing bridge over the proposed Canadian canal, and two 104-ft. lattice girders over the Canadian channel. The bridge is to be opened for traffic this year, probably by Dec. 1.

The sites of most of the piers are on rock. By the specifications the contractor is to be allowed at the discretion of the chief engineer to lay concrete in a caisson to one-half the depth of the foundations from the average summer level of the water, the masonry to be carried up from this. In such cases particular care must be taken in depositing the concrete, so that it will not fall any distance through the water. It must be deposited in a covered box, of approved pattern, holding about two cubic yards, and when the box of concrete is placed on the bottom, the box must be drawn up from the concrete. Care must be taken that no hollow places are left in any portion of the caisson, and divers must be sent down to see that all angles and spaces around timbers are properly filled and packed. The concrete must be composed of Portland cement, that will stand the prescribed test, of good, clean, sharp, river sand, and broken stone that will pass through a two-inch mesh, in the proportion of one part of cement, one part of sand and as much stone as the above mortar will take, so as to completely fill all the voids in the stone. The concrete must be thoroughly mixed till each stone is thoroughly coated with mortar, and then allowed to set to a slight extent, before being deposited in the caissons.

The masonry of the piers is to be first-class in every respect, of rock-faced ashlar, no course less than 15 in. thick, and laid in Portland cement with every precaution. The current runs 4 1/2 miles an hour in places in November. The spring current is doubtless swifter, and great quantities of ice are brought down.

The several spans must be proportioned to carry in addition to the dead load two consolidation engines, followed by a train load of 3,000 lbs. per lineal foot, and the maximum strains due to all positions of the live load must be taken in proportioning all the parts of the structure. Floor to be laid with 8 in. x 8 in. white pine ties, spaced 12 in. centre to centre, with two guard rails on each side of track, one 5 in. x 8 in. and the other 10 in. x 10 in.

Variations in temperature to the extent of 180 degrees Fah. must be provided for.

All parts of the structure shall be so proportioned that maximum loads shall in no case produce a greater tension strain upon the net section than the following, in pounds per square inch:

On bottom chords and diagonals, iron, 10,000; steel, 12,000. On counter rods, long verticals and end lower chords, iron, 8,000; steel, 10,000. On wind bracing (with 10,000 lbs. initial strain), iron, 15,000; steel, 18,000. On bottom flange of riveted plate girders used as floor beams, iron, 8,000; steel, 10,000. On bottom flange of riveted lattice girders, iron, 8,000; steel, 10,000. On suspension loops or other members liable to sudden loading, iron, 6,000; steel, 7,000. On solid rolled beams, iron, 8,000; steel, 10,000.

Compression members shall be so proportioned that the maximum load shall in no case cause a greater strain than that determined by the following formulae:

$$P = \frac{8,000}{L^2} \text{ for square end compression members.}$$

$$1 + \frac{40,000}{R^2}$$

$$P = \frac{8,000}{L^2} \text{ for compression members one pin end}$$

$$1 + \frac{30,000}{R^2}$$

and one square end.

$$P = \frac{8,000}{L^2} \text{ for compression members with pin ends.}$$

$$1 + \frac{20,000}{R^2}$$

P = Allowed compression per square inch of cross section.

L = Length of compression member in inches.

R = The least radius of gyration of the section in inches.

For steel substitute 10,000 for 8,000 in the formulae.

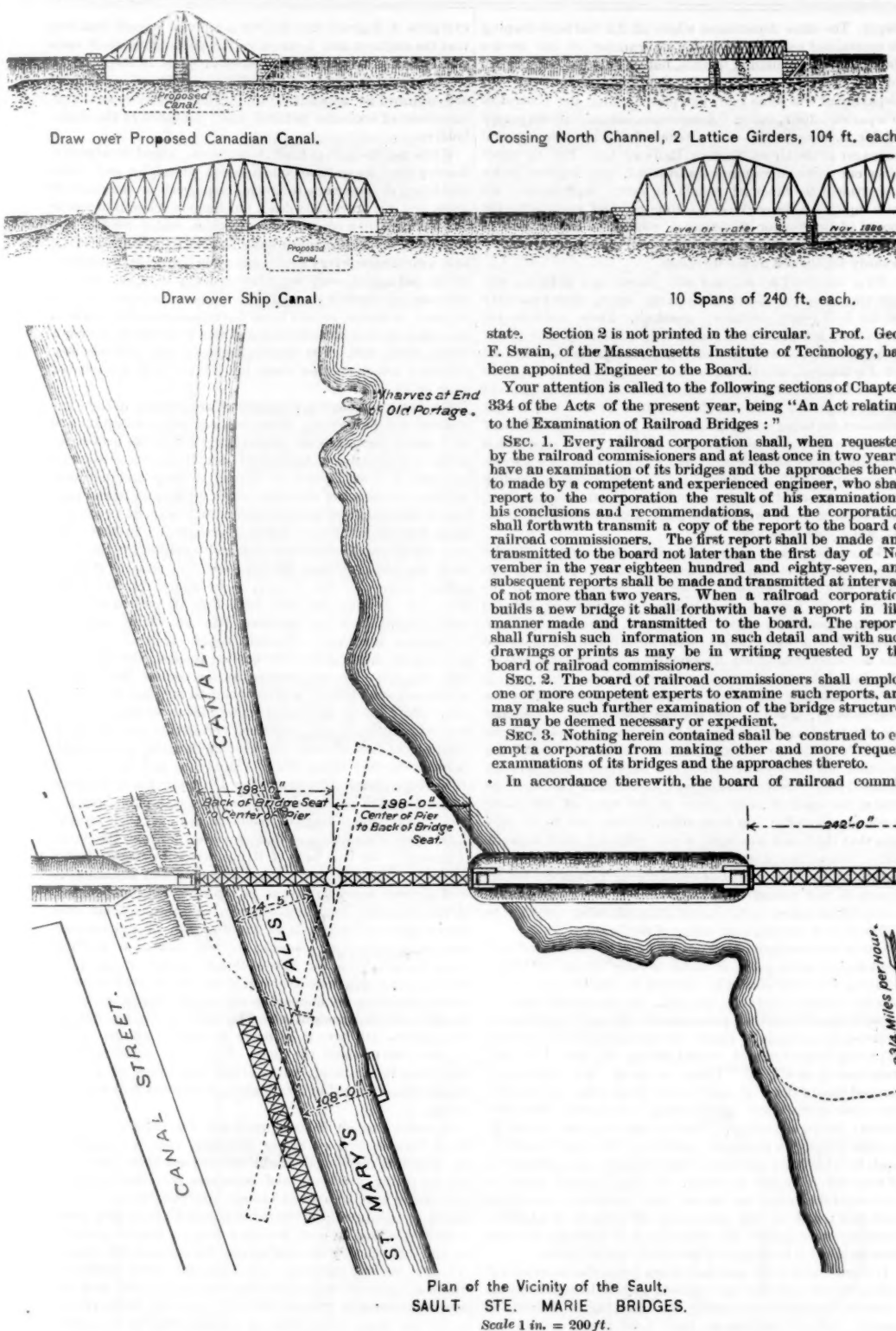
No compression member shall have a length exceeding 45 times its least width.

In rolled beams and girders compression shall be limited as follows in pounds per square inch: In rolled beams used as floor beams or stringers, iron, 8,000; steel, 10,000. In riveted plate girders used as floor beams, gross section, iron, 7,000; steel, 9,000. In riveted lattice girders, gross section, iron, 7,000; steel, 9,000.

To provide for wind strains the top lateral bracing in deck spans and the bottom lateral bracing in through spans shall be proportioned to resist a lateral force equal to 30 lbs. per square foot, on the surface of the train averaging 12 square feet per lineal foot, and also on the vertical surface of one truss; the 260 lbs. pressure from the train surface to be treated as a moving load, and the pressure on the bridge surface as a fixed load. The bottom laterals in deck spans and the top laterals in through spans shall be proportioned to resist a lateral force equal to 50 lbs. per square foot upon the vertical surface of both trusses.

The inner guard rails shall be let down over the ties, till the top of the 3 in. x 8 in. angle iron with which the upper inner angle is covered shall be level with top of rail. The angle iron must be straightened, and the holes for the 1/2 in. screws with which it is to be fastened to the timber must be slotted at the ends, so as to provide for a temperature varying between 40° Fah. below zero, and 140° Fah. above zero. Holes to be in each leg of the angle, 3 ft. apart in centre, and 18 in. apart at each end. The guard rails must be bolted to every fourth tie with a 3/4-in. bolt, so that heads of bolts on the inner guard will not be above the top of the angle iron.

Careful provisions are made in the specifications for testing all material used in the superstructure, and the testing machine used by the contractor must be compared with the U. S. Government machine at the Watertown Arsenal or the Kircaldy machine in England, and, if the results vary, the difference shall be equated and added to, or subtracted



Plan of the Vicinity of the Sault.
SAULT STE. MARIE BRIDGES.
Scale 1 in. = 200 ft.

from, the results obtained from the machine used by the contractor.

All workmanship must be strictly first-class, and not what is commonly termed "merchantable work," and all measurements in laying out work shall be made with iron standards of the same temperature as the iron measured.

The specifications throughout are minute and thorough, and are quite a model of what such documents should be. It is further specified that the contractor shall employ mechanics for every species of mechanical work. No stone work of any quality shall be laid by other than regular masons who have served their time as such. The employes of the contractor shall at all times obey the directions of the engineer or his deputies with respect to the work; and if any overseer, agent or workman of the contractor shall be found unfaithful or incompetent by the engineer, or shall neglect or refuse to obey all reasonable orders of the engineer or his deputies, or shall have promoted disturbance upon the work, the contractor shall, on being required so to do by the chief engineer, at once discharge said person, and shall no longer employ him upon the work.

This bridge is building by the Sault Ste. Marie Bridge Co. for the Canadian Pacific, the Minneapolis, Sault Ste. Marie & Atlantic and the Duluth, South Shore & Atlantic. The chief engineer is Mr. P. Alex. Peterson, the contractor for the masonry Mr. R. G. Reed, and for the superstructure the Dominion Bridge Co., of Lachine.

The Massachusetts Law Concerning Railroad Bridges.

The Massachusetts Board of Railroad Commissioners have issued the following circular to the railroad companies in the

state. Section 2 is not printed in the circular. Prof. Geo. F. Swain, of the Massachusetts Institute of Technology, has been appointed Engineer to the Board.

Your attention is called to the following sections of Chapter 334 of the Acts of the present year, being "An Act relating to the Examination of Railroad Bridges:"

SEC. 1. Every railroad corporation shall, when requested by the railroad commissioners and at least once in two years, have an examination of its bridges and the approaches thereto made by a competent and experienced engineer, who shall report to the corporation the result of his examinations, his conclusions and recommendations, and the corporation shall forthwith transmit a copy of the report to the board of railroad commissioners. The first report shall be made and transmitted to the board not later than the first day of November in the year eighteen hundred and eighty-seven, and subsequent reports shall be made and transmitted at intervals of not more than two years. When a railroad corporation builds a new bridge it shall forthwith have a report in like manner made and transmitted to the board. The reports shall furnish such information in such detail and with such drawings or prints as may be in writing requested by the board of railroad commissioners.

SEC. 2. The board of railroad commissioners shall employ one or more competent experts to examine such reports, and may make such further examination of the bridge structures as may be deemed necessary or expedient.

SEC. 3. Nothing herein contained shall be construed to exempt a corporation from making other and more frequent examinations of its bridges and the approaches thereto.

In accordance therewith, the board of railroad commis-

o be either those under IV. (a), or the heaviest loads in actual use on the road—whichever causes the greatest stresses—and are to be clearly shown or stated on the strain sheet. The actual loads in use may, if desired, be considered in the calculation as replaced by a suitable uniform load headed by a suitable concentrated load.

If practicable, the information called for under IV. (b), (c) and (d) shall all be given on the strain-sheet.

III. Blue prints or drawings showing complete dimensions of each structure, with sections and dimensions of every part, and details of all connections or splices. Scales for drawings to be: (a) For general elevations, cross-sections and plan, not less than $\frac{1}{4}$ in. to the foot; (b) for all details of connections and splices, and sections of parts, not less than $\frac{1}{8}$ in. to the foot, and preferably not less than $\frac{1}{4}$ in. to the foot. The complete floor system is to be clearly shown on these drawings.

These sheets, together with the strain-sheet and the table under I., shall be made of uniform size, 28 in. x 40 in., including a margin on the left hand side of 2 in.

IV. For each bridge: (a) If built to definite specifications, a copy of such specifications, together with a statement as to the tests, superintendence, etc., by which they were enforced.

(b) If built without definite specifications, a statement of the source and quality of the material employed, whether any tests were made upon it, together with the results of such tests.

(c) A statement of the frequency with which it has been inspected, and by whom; and, so far as known, the results of any tests applied to it since its erection.

(d) If not given under (a), a statement of the loads for which it was calculated, and of the stresses allowed per square inch under different circumstances.

V. A report by a competent and experienced engineer, as required by Sec. 1 of the act referred to above, which report shall include the results of his examinations, his conclusion and recommendations, not only in regard to the bridge structure itself, but also in regard to the approaches to the bridge, and the piers and abutments.

Plans not conforming to the above requirements, if already prepared, may be presented to the board for approval.

Annual Convention of the American Society of Civil Engineers.

The proceedings of the Kaaterskill convention to include Tuesday were reported in the *Railroad Gazette* last week.

WEDNESDAY, JULY 6.

Mr. T. C. Clarke being absent, Mr. R. E. McMath was elected Chairman of the convention and assumed the chair. The first paper presented was Sewage Disposal in Massachusetts, by Mr. F. P. Stearns, followed by a paper on the same subject, by Mr. C. A. Allen; oral discussions followed by Messrs. Eliot C. Clarke, Ward, Worthen, North, Schaeffer, Oberlin Smith, Stearns, Church, Moore, Kuichling, Wiley and McMath.

The Secretary announced that the first paper of the afternoon would be on the subject of Cable Railway Propulsion, after which Prof. R. H. Thurston, of Cornell University, introduced the subject of a proper supervision of funds appropriated by the Government for the furtherance of technical education, and suggested the appointment of a standing committee of the society in this direction.

Discussion of this matter followed by Messrs. North, Oberlin Smith, Moore, and Wellington, and action was deferred until the business meeting.

At the afternoon session the first paper presented was Cable Railway Propulsion on the New York and Brooklyn Bridge, by Mr. G. Leverich, which was discussed by Messrs. Cooper, Brown, Ward, Bogart, Flagg, Stearns and the author. Mr. J. S. Schaeffer gave an oral description of the Newark Sewerage System, and the subject was discussed by Messrs. Flagg, Stearns, Kuichling, McAlpine, Worthen and Moore. The Secretary read an invitation extended to the members of the society by the Julien Electric Company to visit and inspect their cars in operation on the Fourth Avenue Railroad in New York City, and announced that the regular business meeting would take place in the evening.

The business meeting convened at 8:30, President William E. Worthen in the chair.

Tellers were appointed to canvas the regular ballot, and reports of committees presented. The Committee on Standard Time was continued, also the committees on a Library for Joint Use, on the Proper Relation to Each Other of Railroad Wheels and Rails, and on Compressive Strength of Cements. A Nominating Committee was appointed, consisting of five members, one from each district, considering the geographical distribution of the members of the society. The Nominating Committee consists of Col. Wm. H. Paine, Messrs. Clemens Harschel, Frederic Graff, R. E. McMath and Chas. H. Latrobe. A resolution proposing to create a grade of students of the society was offered by Mr. R. E. McMath, and discussed by Messrs. Whittemore, Cooper, Wellington, Davis, Oberlin Smith, McMath, Thurston and Moore. Resolutions were also offered in relation to the appointment of a committee on the subject

sioners request you to transmit to them, on or before the first day of November next, the following information, plans, etc., relating to the bridge structures on the line of your railroad and its branches, said information, etc., to be given for every bridge structure of over ten feet opening in the clear, between abutments, but not to include highway or street bridges over the road.

I. A statement, in tabular form, giving in order the following data: (1) number of bridge; (2) town in which, and (3) line upon which it is situated; (4) precise location upon the line, if on record; (5) direction and distance from, and name of nearest station; (6) ordinary name; (7) nature of crossing (stream, street, etc.); (8) number of openings, and clear span of each; (9) length over all; (10) material; (11) general style of bridge; (12) whether deck or through; (13) approximate maximum height of rail above stream, street, etc.; (14) date of erection; (15) names of designer and of builder; (16) by whom erected; (17) whether or not built to definite specifications. On this sheet shall also be stated the weights of the heaviest engines, tenders, and loaded cars at present in use on the road, specifying load on each axle, and distances apart.

This table is preferably not to be a blue print, so that additions can be made to it from time to time, and is to be on one or more sheets of uniform size. Sample sheets for the above returns can be seen at the office of the board.

II. A "strain-sheet" for each structure, giving—

(a) For framed structures, the calculated maximum stress in each piece;

(b) For plate-girders and beams (including floor beams and stringers of truss bridges), the maximum moment and shear at points not over 10 ft. apart, including the centre and ends.

The loads to be assumed in making out the strain-sheet are

of inspection and maintenance of railroads, and in relation to the appointing of a committee on technical education and professional training.

THURSDAY.

The Secretary read a letter from Mr. Colné in reference to the Panama Canal and in refutation of Mr. Boulanger's statements of a few weeks previous, and exhibited a profile sent by Mr. Colné. The subject was discussed by Messrs. Moore, McAlpine, Bogart and Cooper.

The first paper presented was a discussion on Vibration of Bridges, by Mr. T. H. Johnson. Papers on Stresses in Bridges, by W. H. Booth; Compressive Strength of Steel and Iron, by C. A. Marshall; Strength of Bessemer Steel Bridge Compression Members, by J. G. Dagon; the Kentucky and Indiana Bridge, by Mace Moulton, and the paper by Prof. Swain were presented, and a motion was offered and carried that they be distributed for written discussion. Discussions on the American Line from Vera Cruz to the City of Mexico, by Messrs. O. F. Nicholas and A. Bryson, were presented.

The afternoon session convened at 3:30, Mr. Robert E. McMath in the chair.

President Worthen read a letter in reference to the Panama question.

Additional written discussions of the subject of the Inspection and Maintenance of Railroad Structures were presented from Messrs. Geo. H. Pegram, J. A. L. Waddell, G. Bouscaren and G. Lindenthal, and the subject was orally discussed by Messrs. Whittemore, Moore and McAlpine.

FRIDAY.

A visit was made to the cement mines and works at Binnewater; collation on invitation of Mr. F. O. Norton; return home.

Baughman's Patent Tube Cutter.

The accompanying engraving represents a handy tool designed for cutting off old tubes for safe ending, inside the tube sheet, and for removal and cutting off the ends of tubes to proper length after they have been placed in the boiler and expanded at one end.

It is claimed that the use of this tool effects a great saving in time, and avoids the danger of splitting the tube, as often



Baughman's Patent Boiler Tube Cutter.

Made by MESSRS. PEDRICK & AYER, Flanders Machine Works, Philadelphia, Pa.

occurs when the chisel is used. It dispenses with all marking and taking out tubes after they have been put in the boiler and marked to cut to length, as is generally done with locomotive tubes. With this cutter it is only necessary to put them in once, expand in fire-box and cut to length. It makes no difference how uneven the tube sheet may be, the cutting is gauged from the tube sheet, and the ends will all be an equal distance from it.

The cutter appears to be durable and not likely to get out of order. The tool is made of steel and hardened. It has three revolving cutters that cut from the inside of tube, and are easily replaced. While cutting it is stated that 300 2-in. tubes have been taken out in ten hours at the Atlanta Shops of Richmond & Danville. Different sizes are built for the various sizes of boiler tubes.

Any further particulars may be obtained of the makers, Messrs. Pedrick & Ayer, L. B. Flanders Machine Works, Philadelphia.

English Railroads—Their Administration, and the Status and Duties of Executive Officers.

VI.

ACCOUNTS AND AUDITING.

The chief accountant of an English railroad has several departmental accountants and audit officers under him, and therefore confines his functions principally to supervising and summarizing the results of the sub-accountants. The audit department of most railroads is divided into two branches, viz.: the "passenger" (or, as it is sometimes called, the "coaching" department, from railroads being the successors of the old horse coach business) and the "goods" (freight) the latter frequently including the mineral department.

The audit department does not on most lines concern itself with the audit or verification of the whole of the accounts of the company. It often deals only with records of traffic, of the numbers of passengers, or tons of merchandise carried to and from all stations, and of the moneys received at each

depot. The other department where all the real book-keeping is centralized and carried on for all branches of the service belongs to the domain of finance, but still under the control of the chief accountant. On the Midland Railway this department was some years ago placed under the control of a separate officer, called "finance accountant," in the person of Mr. S. Swarbrick, who afterwards became the general manager of the Great Eastern Railway Co. But on other lines one chief accountant controls all, and focuses in his department the financial results of every department. He also supervises the engineer's estimates, and reports to the board of directors or the finance committee any excess of expenditure on particular works over the estimates previously authorized by the directors.

Over the chief accountant are placed two auditors, who are chosen by the shareholders from among their own body at the half yearly statutory meetings. These auditors are absolutely independent of the directors, and they have power to penetrate, in virtue of rights conferred upon them by act of Parliament, into the accounts of every department. On some lines in the metropolis a professional public accountant is also employed to fill one of the offices of auditor, as the auditors not being skilled accountants, generally exercise their powers in a merely nominal sort of way, their supervision sometimes only amounting to half a day's labor once a week, or perhaps month, and then being confined only to leading heads of information. They get but nominal remuneration, say \$500 a year, while the chief accountant gets up to \$7,500 a year in salary.

Sometimes, when an auditor, like the late Sir Charles Whetham (at one time Lord Mayor of London) does go out of his way and maintain, as he did, in opposition to the board of the South Eastern Railway that they had charged certain expenditure under the heads of Revenue and Capital in different proportions to what he approved, and wished the accounts remodeled, friction of a serious kind ensues. The board held that he was entrenching upon their prerogatives; that they, like him, derived their powers from the shareholders; that they and not the auditors were responsible for the financial policy of the company; and that the auditor's functions were confined to simply certifying whether all moneys received and expended had been accounted for. Upon this issue was joined, and the board defeated the auditor on an appeal to the votes of the shareholders, and ousted him from office. There can be no question that the board was right in not suffering itself to be reduced to a nullity, and the auditor would have been equally within his right, if instead of endeavoring to remodel the accounts he had passed them under protest and made his own independent report to the shareholders showing wherein he differed from the financial policy of the board.

One of the knottiest questions to be solved in English railroad finance is the point at which certain classes of expenditure and interest should be charged to capital account and at what point to revenue account. In the earliest days of construction in England, promoters of railroads raised money in lavish proportions by means of the facilities then existing of paying interest out of capital during the period of construction of new lines. Later on, about 1845, parliament stopped this in cases of new bodies promoting independent lines, and only allowed the privilege to existing companies already paying dividends. Thus competition was struck at, as those promoters who were earliest in the field burnt the boats by which they had themselves originally crossed the river of financial difficulty in safety. For nearly forty years the wisdom of this policy has never been questioned, much less disturbed; and no cry was more effectual in frightening timid investors against the securities of a railroad company than an allusion to its paying dividends out of capital.

It is only within the past half dozen years that more logical and more rational views are gaining ground in regard to the scientific principles governing the charging of interest to capital. Acts of parliament have been passed within the last five or six years, empowering in four or five cases large railroad, canal and dock companies independently promoted, as competing schemes, to charge interest to capital account during construction. The established companies bitterly opposed these schemes not only on grounds of their being competitive, but because they sanctioned new and dangerous precedents. The present temper of Parliament, however, is opposed to any longer continuance of railroad monopoly. It is true that the power to pay interest out of capital has been abused by some of the railroad companies exercising it; because they have not been merely content with crediting revenue and debiting capital with interest on expenditure on new lines during the period of their construction, but they in some cases continued long after the new lines were in use, on the ground that they were still in their infancy or "unproductive."

Moreover on some railroads without any dead weight on them in respect of recent outlays for new extensions of road dividends have partly been made up by charging part of the cost of renewals of road, or rolling stock, to capital.

The most ingenious devices have been resorted to to gain this end in the long run. For example, when steel rails came into vogue, some companies debited the difference in value between the cost of the iron rails which were taken up and the cost of steel rails laid down to capital account. In other cases the whole expenditure would be carried to "suspense account" and then written off by degrees, partly to capital and partly to revenue account, over a series of years. In the cases of rolling stock instances are on record where, say a number of engines or cars are worn out and past repair. Instead of building new cars to replace them and charging the cost against revenue, new cars are bought as additional stock and charged against capital, while the old cars are put on a siding and still figure in the books as effective. This

evil grew so flagrant that in 1868 a bill was passed enacting that the engineer and locomotive superintendent shall each certify half-yearly that all the stock or plant in their charge has been kept in a state of full efficiency. These certificates are published as appendices to the half yearly report and statement of accounts printed and published to the shareholders.

Watering stock, ill-defined mortgages, illegal mortgages, floating debt, leases made on one-sided principles, and other kite-flying devices came to ignominious grief in the panic of 1866, and are practically dead, but the non-renewal of worn-out stock is still a contentious subject on many roads. The rule that every engine must make some mileage during every half year insures every engine being in working condition. As the mileage of every engine is carefully kept, the auditor can soon see whether they have all made mileage or not. A car may, however, be sent home for repairs, and side-tracked, or broken up and no auditor can detect it except by taking a census of the cars. The clearing house system prevents any car being lost on another road, but it takes no cognizance of a car on its own road.

The duties of a chief accountant so far as relates to the compilation of a half-yearly balance sheet for publication are very much simplified by legislation. Under the provisions of the "Regulation of Railways" act, 1868, every railroad company in Great Britain is obliged to keep and publish a uniform statement of accounts, made up in so clear and popular a form that any one can understand them, and compare them with the accounts of another company. In this way they admit of critical comparison and analysis by the ordinary shareholder, and he can see for himself if he is getting value for his money. In many respects, however, it cannot be said that English railroads have even yet attained to anything like an ideal standard of account keeping. Though copies of the accounts are easily attainable by others besides shareholders, and are sent to the newspapers for review, the dreams of railroad statisticians and economists, are far off realization. Mr. Fleming and other independent writers on railway working in the magazines and periodicals, are constantly pointing out that lines like the East Indian, the government railways in New South Wales (Australia) and the Cape of Good Hope (South Africa) and the Pennsylvania in America are far ahead in the manner of compiling and publishing the details of the ton-mileage of goods carried over their several lines, thereby admitting of that great desideratum, the "cost of haulage"—the true basis of fixing rates of freight—being achieved. Many English general managers and accountants scoff at these fancy figures as being worthless, but judging by the advances made on French, German, Belgian and other continental railroads in the direction of reducing all these matters to a real scientific footing, instead of drifting along according to the rule-of-thumb habits of our forefathers, and seeing also the real scope for improvement in railroad working by increasing net profits which accurate statistics so easily admit of. The time is not far distant when efforts will have to be made to adapt systems of accounts to the needs of the times. It is only quite recently that it has been possible to ascertain how much of a total freight rate consisted of terminals, and how much of haulage charge.

On some English colonial railroads the lines are being divided into sections of 200 or 300 miles each, according to the principal classes of traffic carried on those sections, and the ruling gradients and other elements that so materially enter into the cost of haulage and rate-fixing. On no branch of business in the world can a man fix the selling price of an article until he can tell what it costs him to produce it; and it is only by winnowing out the unprofitable classes of traffic, or only carrying it at times and under such conditions as leave the companies some margin of profit, that the present diminishing rates of dividends on some railways can on the one hand be arrested, or regard paid, on the other hand, to the growing severity of competition in industrial enterprise in England.

Another direction in which the labors of a chief accountant are being lightened and simplified is in the amalgamation, or consolidation, of the different issues of stocks and shares at a uniform rate of interest. Many railway companies have during the past forty years not only created additional issues of different classes of stocks or shares, but have issued the same class of shares or stocks with a different order of priority as regard claims to dividend, or different rates of interest, or guarantee of interest. These various and complicated issues of stock involved great and unnecessary labor in account keeping, and in calculating dividends, for which separate warrants, payable at the company's bankers, have to be issued direct to each shareholder half yearly. Two of the largest companies a few years ago, viz., the Great Western and the Northeastern, successfully carried through two gigantic consolidation operations of this kind, much to the comfort of their accountancy staff and the satisfaction of the stock exchanges and the shareholders. The Northeastern Co. dignified its new issue by the name of "consols," after the manner of the securities of the British Government, and the change undoubtedly added both to the solidity and negotiability of the security itself.

German Compromise Sleeping Car.

The illustrations in this number of a German sleeping car, or perhaps more properly speaking a reclining car in distinction to the cars where bed-clothes are provided, designed by Chief Engineer Claus of the Brunswick system, will be of general interest to railroad men from the ingenuity of the arrangement more than for any immediate possible application on our roads.

The object is to obtain as much sleeping accommodation as

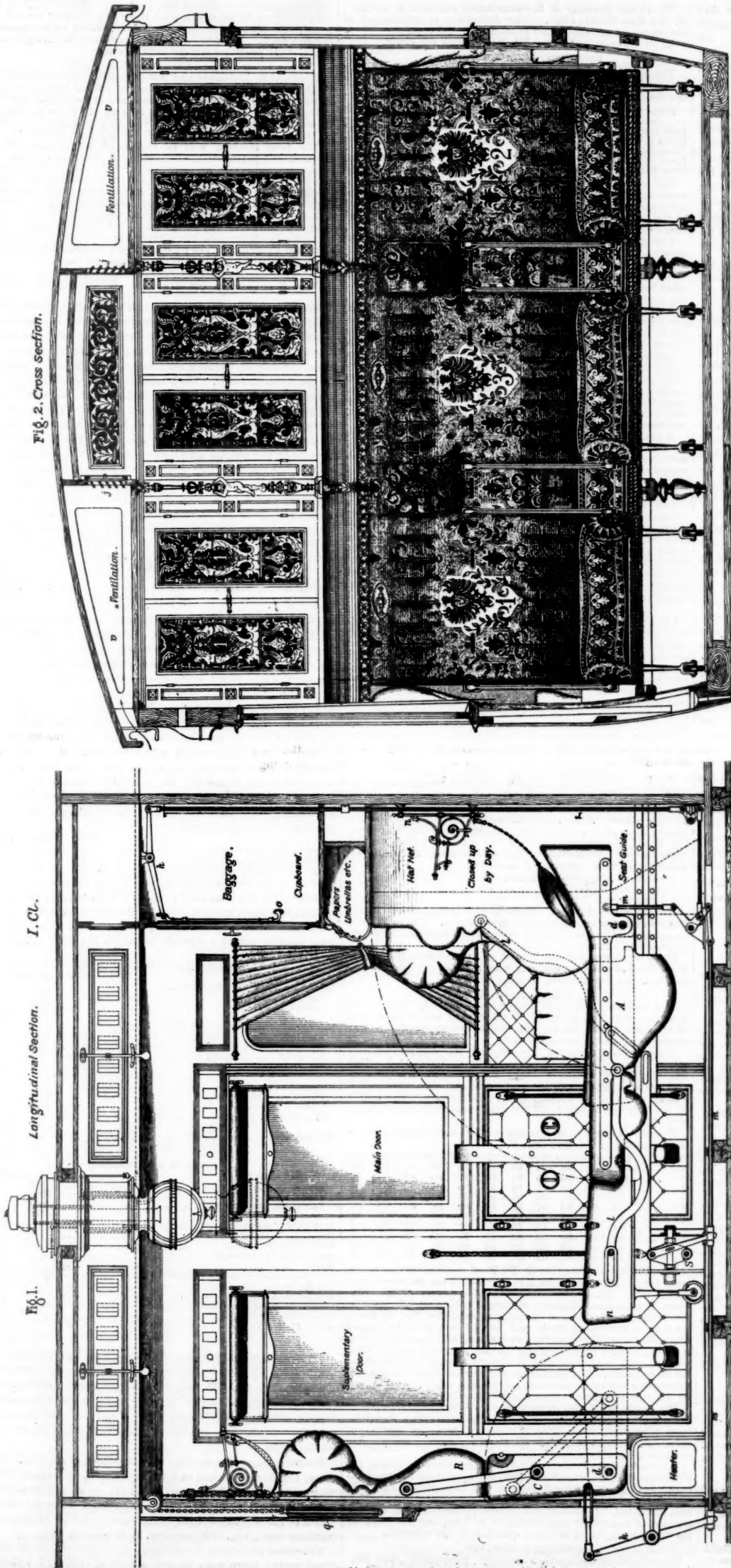
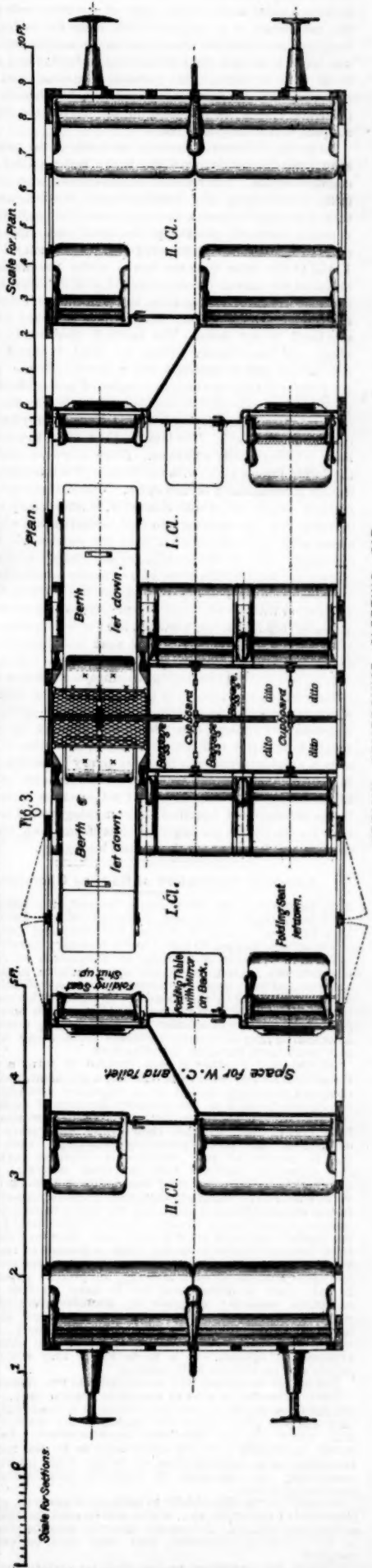
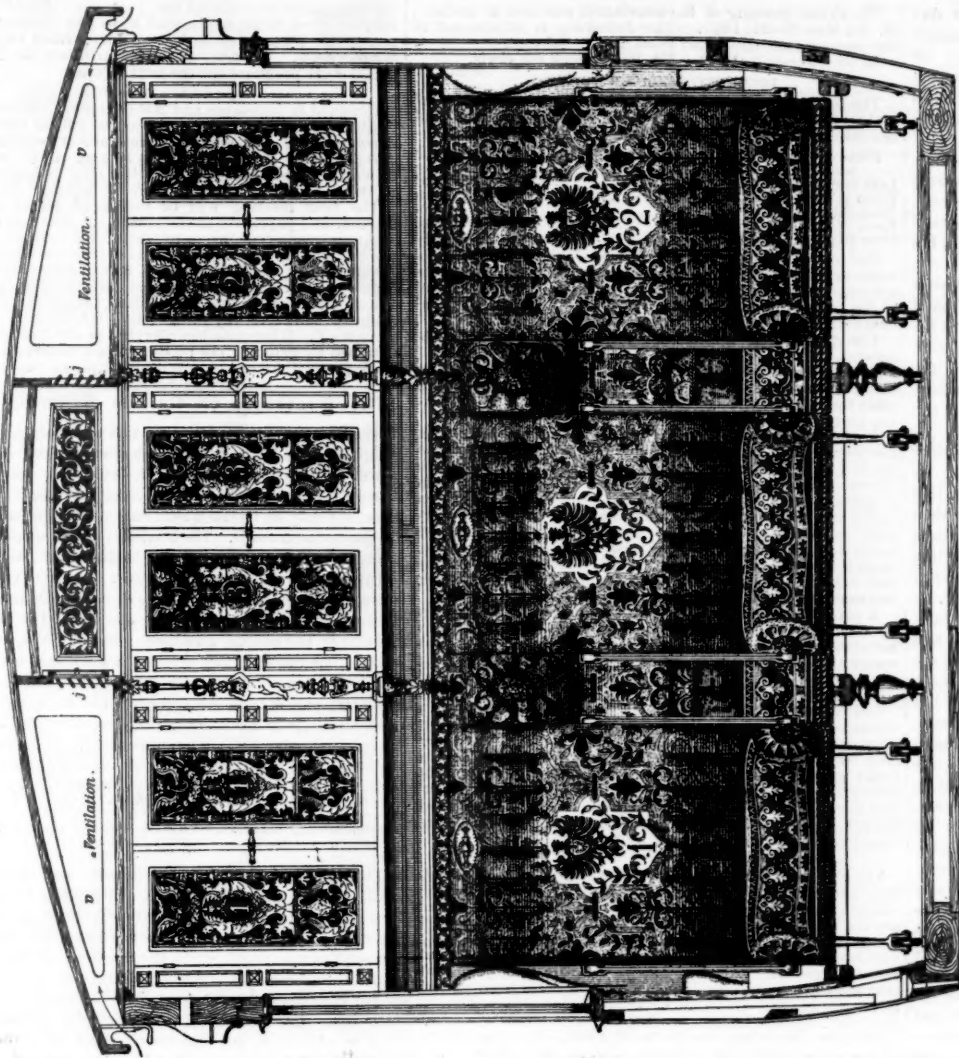


Fig. 2. Cross Section.



GERMAN COMPROMISE SLEEPING CAR.

possible without destroying the capacity of the car for day use and without involving special attendants and the supply of bed linen and blankets. In doing this an ordinary 1st and 2d class car provided with w. c. and toilet accommodation (not at all exceptional now in Germany) is taken as a basis for the general size of the car, division of compartments, etc., as shown in plan in fig. 3.

The end compartments there shown have the usual arrangement of seats, and the seats in the first-class compartments are very much as usual when arranged for day use, except that the two seats furthest from the car centre are somewhat narrower in projection from the compartment wall. On the door between these seats is a mirror which can be let down to form a small table. Over each of the three seats nearest the car centre is a cupboard with doors for holding hand baggage, and between these cupboards and the tops of the seat backs is an open shelf for holding umbrellas and articles to be used en route. The entrance door is as usual in the centre of the compartment on each side, but there is a supplementary door, as indicated in fig. 1, for use when the sleeping berths are pulled out.

To do this, the narrow seats on each side of the toilet door are folded against the wall, the backs being pulled up by counterweights. The recessed handles shown over each seat in fig. 2, something like Pullman berth handles, are then turned to unlatch the seat, and by means of the handle the back is pulled forward, pivoted at its lower end. This action causes the seat to travel forward into the position *n-l* in fig. 1, and at the same time the bar *m*, under the car floor, by means of the various levers connected with it, locks the folding seat, the main door and the baggage cupboard door, and releases the supplementary door, which is locked when the side berth is not down. The berth is then ready for the night, and immediately behind its head is found a hat net and a pillow fastened by a chain. If the passenger prefers to have the baggage cupboard accessible through the night he needs only to pull down the bolt *o* on the inside of the cupboard and the cupboard does not become locked by pulling out the berth. The lamp in the roof of the compartment is telescopically arranged. When down as shown by the dotted lines it burns with full light. When pushed up the light is automatically turned down. Ventilation, but seemingly of rather inefficient character, is afforded by the side openings from the interior into roof compartments which are apparently in communication with the outside air by side openings. The car has also the register slides over the doors (shown in fig. 1 by the rows of rectangles above the door curtains), which are usual in European cars. These, like the ventilators with which many of our cars are provided just above the top line of the windows, are never very efficient.

The whole arrangement is very neat and ingenious, but except for parties known to each other there seems to be the radical defect of all sleeping car arrangements which are not either entirely separate, as in the stateroom of a steamboat, where the owner can lock himself up, or else so public that a watchman, if vigilant, can observe any attempt by one passenger to interfere with another. Apropos of this it would seem a great improvement in the ordinary American sleeping car if the upper and lower berths had separate curtains, as has been done in some cases, but not generally introduced. In the arrangement described above nothing would be easier than for the middle passenger to chloroform both his companions and decamp with their entire belongings.

American Association of Railway Chemists.

This association has been lately formed, the officers for 1887 being Dr. C. M. Cresson, President; Walter Lee Brown, Vice-President, and H. B. Hodges, Secretary and Treasurer.

The association has 20 active and 8 honorary members. The chief objects of forming an association of railway chemists are: First, to decide upon uniform methods of analysis and test; second, to adopt uniform specifications for all material tested by the chemist; third, to enable members to report results of such analyses, or to give such special information relative to inferior material coming under their attention as may save other members from doing unnecessary work upon the same investigations.

At the first meeting it was decided to form a non-incorporated society with three officers, a president, vice-president and secretary, to act as an executive committee, the elections to be held at the January meetings of each year; officers elected to serve for one year; meetings to be held every four months, their time and place to be designated at each preceding meeting; each meeting to consist of two sections, a business portion or the executive session, and an open session; active members to be only the chief and assistant chemists of railways which have regularly equipped chemical laboratories. It was estimated that if all joined, the active members would number from fifteen to twenty. To cover incidental expenses, the annual dues were made \$1 per year; honorary members to be the engineers of tests and their assistants of such railways. They are to be invited to attend both the executive and open sessions of each meeting, to present papers and to take part in discussions, but to have no vote in the executive sessions; chemists of manufacturers of railway supplies and other chemists interested in such matters, to be invited to the open session only, during which they can vote when it is desired to obtain an expression of opinion. It is to be hoped they will furnish papers and participate in discussions.

The papers to be read will be divided into two classes: First. Those to be read in executive session only. These are not to be published, nor any results to be made public, as they will bear chiefly upon the quality of the market products, which concern individual manufacturers. In other words, the society will not allow itself to be the means of furnishing any manufacturer or dealer with information concerning the character of products manufactured or handled by others.

Second. Pertaining chiefly to methods of analysis, general character of materials, etc., which will be read and discussed at the open sessions. All papers, however, must be presented to the executive committee, that they may be properly assigned.

Votes in the executive session shall be by laboratories—votes by proxy or by letter to be allowed. All questions to be decided by a two-thirds vote of all the chief chemists of the association.

The second meeting of the association was held at Buffalo, N. Y., May 23-24, 1887. The following is an account of the proceedings, abstracted from the official report:

In Dr. Cresson's absence, Mr. Brown took the chair.

LOCOMOTIVE BOILER WATERS.

The following classification for carbonated, non-alkaline waters (that is, those containing lime and magnesia salts, but not containing much alkaline salts), was officially adopted:

Those containing scale-producing matter.	To be designated as—
Less than 15 grains per gallon.....	Good
From 15 to 20 grains per gallon.....	Fair
From 20 to 30 grains per gallon.....	Poor
From 30 to 40 grains per gallon.....	Bad
Over 40 grains per gallon.....	Very bad

The scale-forming matter consisting of silica, alumina and oxide of iron, lime and magnesia salts. This classification not considered as scientific, but as being practical, to convey to the railway official some sort of an idea as to the general character of any water.

The classification of alkaline waters was left open for the present.

It was agreed that all reports of boiler waters hereafter made by the chemists of the association should, additionally, state the number of pounds of incrusting solids or scale-forming matter per 1,000 gallons.

A thorough discussion of the various methods of water analysis was made and much valuable information elicited. A paper upon this subject by Mr. R. R. Moore (Atchison, Topeka & Santa Fe) recognized that a quick method of arriving at the value of a water for boiler use was important, and that, in case of a very good or a very bad water, the determination of total solids was sufficient. It was agreed that in the majority of cases it was necessary to separate the residue by evaporation into soluble and insoluble portions, and to determine lime and magnesia separately in each portion.

A process based upon the preceding and termed "alkalies by washing," adopted by the Chicago, Burlington & Quincy laboratory, a similar one used on the Chicago & Northwestern, and a so-called "calculation" method employed on the Chicago, Milwaukee & St. Paul were discussed.

The meeting recommended:

1st. The substitution of purer waters for inferior waters whenever possible. 2d. When this was not practicable, and purification was necessary, to effect this outside the locomotive, by use of lime, soda, settling tanks, etc. 3d. To use boiler purges (so-called "boiler compounds") only when absolutely necessary, and further, it was conceded that the best interests of each company would be sustained by making the purge under the superintendence of each laboratory, and supplying it to engineers for use were discussed.

SOAPS.

The character and composition of various kinds of soap, their action upon paint and methods of analysis were discussed. It was agreed that, aside from toilet soaps, which are not so important, a railroad needs three classes of car soap. First, a neutral make, which must not injure a varnished surface, for washing cars in the yards; second, one of medium alkalinity, for washing cars that are to be re-varnished, and where the outer layer of varnish carrying the dirt, smoke and imbedded cinder is to be removed; third, alkaline, for trucks and other work where much dirt, grease, etc., are to be removed. For this purpose it has been found that a potash soap is the cheapest and most effective.

DISINFECTANTS FOR RAILWAY USE.

Analyses of various market products show that some are worthless or commercially fraudulent, i. e., made up of common and well known chemicals, more or less disguised and sold at high prices. After much discussion it was decided that ice should be kept in urinals during the summer, and the following liquid disinfectant used on the Union Pacific was accepted as the best deodorizer and disinfectant for rinsing out urinals and other purposes of the kind:

- 1 Gramme corrosive sublimate.
- 4 Grammes blue vitrol.
- 1 Litre water.

A small amount of an aniline green being added to distinguish this poisonous solution from water. The solution to be made shortly before using, owing to its tendency to undergo chemical change.

Chloride of zinc solution is used on the Chicago, Milwaukee & St. Paul as a deodorizer and was adopted by the association as being well adapted to this purpose.

LUBRICATING OILS.

The various methods of tests were discussed. Mr. Davidson submitted blue prints of his viscometer and of the curves of viscosity given by various oils by his apparatus; he also showed samples of the oils tested.

The observed order of viscosity of the samples tested is given below—the classification being as follows: A, dark filtered mineral cylinder stock; B and C, light filtered mineral stock; D, dark unfiltered mineral cylinder stock; E, F and H, cylinder lubricants (i. e., mixtures, or "valve-oil"); G, acidless tallow oil; I, melted acidless tallow; and J, extra lard oil.

Results—viscosity in seconds per 100 cubic centimetres—from 250 deg. F. to 350 deg. F.

Temp.	250°	260°	270°	280°	290°	300°	310°	320°	330°	340°	350°
A.....	99	97	96	94	92	90	88	86	84	83	82
B.....	100	98	96	93	91	89	87	85	83	82	81
C.....	97	94	93	91	89	87	86	84	83	82	81
D.....	95	93	91	89	87	86	84	83	82	81	80
E.....	95	92	90	87	85	83	82	81	80	80	80
F.....	93	90	88	86	84	83	82	81	80	79	78
G.....	91	88	86	84	83	82	81	79	79	79	79
H.....	91	87	84	83	81	80	79	78	78	77	77
I.....	85	84	83	83	82	81	81	80	79	78	77
J.....	84	83	82	81	80	79	77	76	75	75	75

The Chicago, Milwaukee & St. Paul viscometer gave results very concordant with Mr. Davidson's on the same samples of oils. Mr. Brown submitted blue prints of the Chicago, Burlington & Quincy standard cold test box and its accompanying bottle and holder, and exhibited the oil tester used for determining flash and fire of heavy oils; a copper cup used for determining loss at 100 and 350 degrees F., and a set of cylinder and black oils having varying percentages of tar, and also gave details of method used for estimating tar in such oils. The appearance of various cylinder oils and mixtures after evaporation upon blotting paper, was shown by a series of samples submitted by Mr. Davidson.

The question of the deterioration of standard thermometers was considered and it was advised that they should be re-standardized from time to time. It was the opinion of those present that each railroad should purchase no cylinder mixtures, but should make its own "valve oil."

A lecture on the subject of lubricating oils was given by Professor Deuton, who is constructing apparatus for mechanically testing oils for the Standard Oil Company. The role played by animal and mineral oils for cylinder lubrication was discussed. It seemed the general opinion that a certain amount of animal oil was necessary, as it appeared to increase the "spreading" and adhesive qualities of the mixture.

FREIGHT CAR PAINT.

The relation of chemical composition to quality was discussed, and it was agreed that specifications for all kinds of paint were needed. Some members considered that in pur-

chasing paints for railroad use, preference should be given as follows: First to pigments, that is, to dry paints; second to paste, viz., pigment ground in oil only; third to ground and mixed paints. Results of the experiments on freight car paints were promised for the next meeting.

ILLUMINATING OILS.

Confined to kerosenes and 300 degree oil. The association decided to adopt the Elliott cup as its official instrument for kerosenes, and the same cup was further recommended for 300 degree oil, for which it can be used if the bath, instead of water, be of some liquid with higher boiling point. The methods of tests of these oils were discussed at length.

The next meeting will be held Sept. 25, 26 and 27, in Omaha, and papers on the following subjects will be read:

Fire preventives—fire-proof paint, fire extinguishers, anti-fire car heating and lighting; wood preservation—crucifixes, bridge timber, etc.; car wheel iron; brasses and babbitts; coals—classification, methods of determining true value; vehicles for paint—oil, turpentine, etc.; car scrap; mechanical tests for cylinder oil; freight car paint—does grinding in oil increase the covering power? or, does a paint obtained by grinding the pigment in oil possess greater covering power than one obtained by simply mixing?

Tire Breakages on German Railroads in 1886.

The Society of State Railroad Officers of the German Railroads has issued a very thorough study of the breakages of wheel tires for the year 1886, which we condense from *Glaser's Annalen*. This study comprises the breakages of tires, not only on German cars but on foreign cars, running on the German roads. The statistics cover 22,991 miles of track, of which 6,896 miles are double track, on which the breakages were 4,740 against 4,072 in 1885, that is, there were 12.85 breakages on every 100 miles, as against 11.04 in the preceding year, or on a traffic basis, there were 0.66 breakages per million axle miles run in 1885, and 0.76 in 1886. The cause of the increase is attributed principally to the lower temperature prevailing in the months of January, February and March, as compared with the preceding year. More than one-half of the breakages occurred in those three months, namely, 2,834, as against 1,847 in the same period of 1885. The breakages by months were as follows:

June.....	178	September.....	232
October.....	181	May.....	245
November.....	181	April.....	257
December.....	184	January.....	266
July.....	221	February.....	261
August.....	227	March.....	1,317

The breakages caused 24 derailments and 354 detentions while 4,362 breakages caused no disturbance to traffic. No gives appear to have been lost, few injuries were caused, and he damage to property seems to have been but little.

Statistics are given as to the character of the roadbed on which these breakages occurred, but as the amount of roadbed of each description is not given, no lesson can be drawn from these statistics. Most of the breaks, that is, 93.08 per cent. of all, were not discovered until after the wheels to which the tires were attached had traveled some distance, and 78.16 per cent. were discovered on examination of the wheels at the stations after the arrival of trains, 14.92 per cent. were discovered in the shop when the cars were sent in for repairs. For 100,000 trains, the breakages for three years have been as follows:

	1886.	1885.	1884.
Express and fast trains.....	115	94	97
Passenger trains.....	46	32	19
Mixed and freight.....	109	82	65

Of these the breakages were on 2,329 tires before turning; on 378 after first turning; on 116 after second turning. On 38 after third turning; on 11 after fourth turning.

The surface of the fracture in 51.35 per cent. of all breakages showed sound material, in 31.98 per cent. defective material.

CLASSIFICATION OF BREAKAGES 1886. Percentage of whole number.

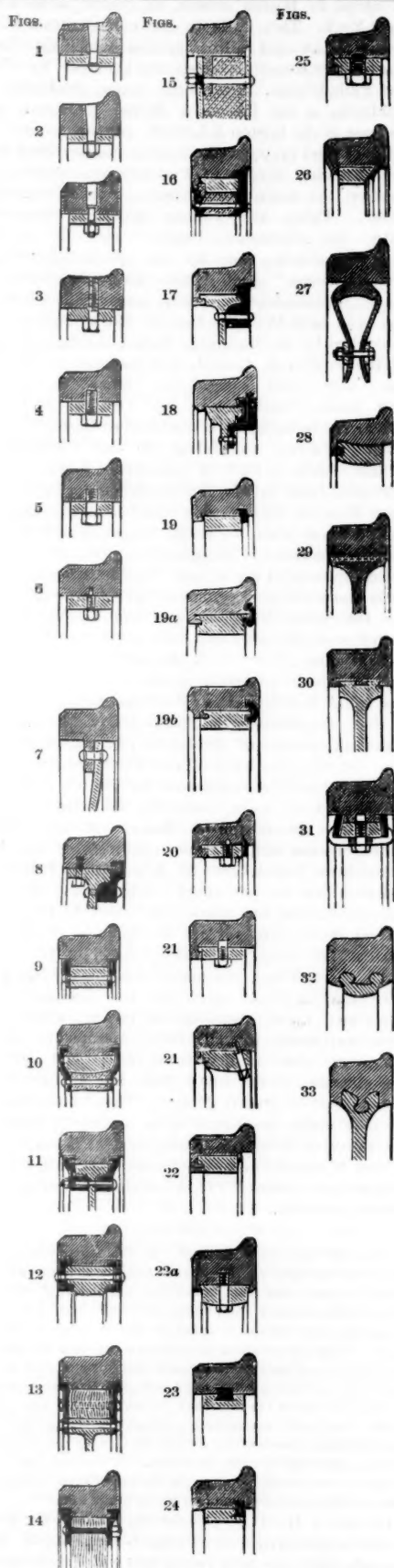
Tires completely broken across:	
Through solid.....	16.9
Through hole.....	23.7
Incomplete fractures across tire:	
Through solid.....	14.
Commencing at hole.....	2.3
On tread.....	2.3
Miscellaneous.....	1.4
Longitudinal splits:	
Widening with use.....	21.
Small.....	15.6
Flat spots.....	0.5
Not classified.....	2.8
	100.0

CAUSE OF BREAKAGES.	Per cent. of total.
Imperfect material.....	6.0
Brittle.....	30.0
Flaws.....	3.0
Bad welds (longitudinal).....	39.0
Bad welds (cross).....	0.1
Excessive shrinkage.....	5.0
Holes for fastening.....	1.8
Bad fitting of fastening.....	4.0
Brake.....	2.0
Extreme changes of temperature.....	18.0
Old flaws.....	1.3
Worn out.....	2.0
Rough track and frogs.....	0.2
Shocks in switching.....	2.0
Other causes.....	28.2
	100.0

The total reported number of existing tires and wheels was 1,368,465. Of these 75,826 were under locomotives, 57,372 under tenders, 102,735 under passenger cars, 7,806 under postal cars, 26,066 under baggage cars, 1,010,810 under freight cars, and 87,850 were held in reserve. On an average there was broken one tire or wheel in 303 as against 1 in 344 in 1885.

Brakes were applied to more than one-third of all tires. Of these, 1,694 were broken or 0.34 per cent. of all wheels running under brakes. This result is exactly equal to that of the preceding year, while the 875,691 tires which were not subjected to the workings of the brake showed 2,836 breaks, or 0.32 per cent., viz., 0.07 per cent. more than in 1885.

Tabulated according to material and construction of the wheel centre, there were in use a total of 190,916 wheels where the wheel and tire consisted of one piece; 246,160



solid wheels made of steel or iron with separate tires; 1,539 wheels with wood centre; 576 with paper centre wheels, and 949,274 spoke wheels. Most of the breaks in proportion to all the wheels in use occurred to the tires on the spoke wheels, viz.: 3,480 = 0.37 per cent. of all. Next come the solid wheels of steel and iron, with 834 breaks = 0.36 per cent.; after that the paper wheels, with 2 breaks = 0.35 per cent.; then the wooden wheels, with 4 breaks = 0.26 per cent., and finally the solid wheels, with 155 breaks = 0.09 per cent. Of the latter, the solid wheels, the solid chilled cast-iron wheels (only 1,424 in number) again furnish the most unfavorable result, with 0.28 per cent. breaks; the crucible and Siemens-Martin solid² steel wheels, on the contrary, only show breaks of 0.14 per cent.

Disk iron and steel wheels with tires did worst where the centre was cast iron, the breakage being 0.91 per cent. of their total number, which are followed by the wheels secured by lead keys or dovetails run in with 0.86 per cent., and the solid steel wheels with 0.52 per cent.

The lowest percentage of breakages was shown by the wrought iron disk wheels with tires (the species most in use), namely, 0.35 per cent.

In 1895 the cast iron disk wheels with the tire secured by

a lead key showed a similarly unfavorable result, as their breaks in that year showed 0.51 per cent., while the comparison of steel wheels with wrought iron disk wheels resulted in favor of the former, viz., 0.23 per cent. against 0.38 per cent.

The spoke wheels with wrought spoke, hub and rim showed 0.45 per cent of breakages; with wrought iron spokes and cast iron hub, 0.18 per cent.; and the cast iron spoke wheels, 4.05 per cent. A definite deduction as to the greater or less usefulness of either the one or the other kind of wheel can, however, not be drawn from the different results as it appears from the reports of several railroad managements, that a reliable showing of the differences between the separate kinds of materials was not made in all cases.*

The apparent larger amount of breakages on spoke wheels as compared with disk wheels, differs from the results shown in former years. The following table shows the results by months for the last three years. According to statistics furnished, there were broken:

	1884.		1885.		1886.	
	Disk wheels.	Spoke wheels	Disk wheels.	Spoke wheels.	Disk wheels.	Spoke wheels.
January			**0 088	**0 069	*0 038	*0 049
February			*0 028	*0 035	*0 066	*0 078
March			0 078	0 022	***0 082	***0 165
April to Sept.	0.147	0.125	0.175	0.101	0.122	0.108
October	0.021	0.019	0.021	0.017	0.017	0.016
November	0.026	0.022	0.018	0.022	0.016	0.012
December	*0.024	*0.028	*0.025	*0.031	*0.017	0.017
Years av...	0.30	0.20	0.37	0.32	0.36	0.37

During the months marked * a low temperature was prevalent, while the months marked ** and particularly those marked *** showed exceedingly severe and continuous cold weather. The results as to the influence of cold weather upon spoked wheels differ from those obtained in other years when the spoked wheels gave favorable results. The cause of this change has not yet been ascertained.

The materials of which the total number of tires made were as follows:

as follows:	Total number.	Proportion broken.
Crucible steel.....	96,009	.....
Cast steel.....	189,688	.....
Siemens Martin.....	91,694	.....
Bessemer steel.....	453,757	.....
Mang. and steel.....	2,039	.....
Steel (not defined further).....	244	.....
Total steel.....	825,621	1 in 303
Puddled steel.....	157,015	1 in 190
Iron.....	65,934	1 in 233
Material not specified.....	138,989	.....

Total tires.....1,197,549

The number of puddled steel and wrought iron tires is rapidly decreasing and steel tires and modern methods of fastening are rapidly gaining ground. The Kaselowski method of fastening tires by means of lead run into a dove-tail groove (figs. 23, 24) is being abandoned.

* These statistics apparently refer only to the failure of tires. Possibly, as in England, the failure of wrought iron or steel centres is unknown.

The principal fastenings in use show the following increase in number of wheels, comparing 1885 and 1886:

System.	1885.	1886.	Increase.
No. 9 to 11	25,940	26,472	Per cent.
No. 10.....	267,338	312,747	31.8
No. 19 a.....	7,774	11,197	44.0
No. 20.....	24,046	30,136	25.3
No. 21.....	13,237	23,261	75.7

The following table shows the results obtained with the principal fastenings during the last three years :

System. Fig. No.	Breakages.	Tires left the wheel, per cent. of breakages.
4, 5, 6	1 in 217	12.3
9, 10, 11	1 in 833	2.9
19	1 in 1111	5.1
19a	1 in 2000	11.5
20	1 in 1160	13.2
21	1 in 435	19.4
23, 24	1 in 244	19.4

The superiority of the Mansell fastening, fig. 9, 10, 11 as a means of preventing a broken tire leaving a wheel are thus very conclusively shown. The percentages given in the last column apply only to those cases where the fastening might be expected to retain the wheel on the tire.

Fastening No. 19, so largely used in Germany, is made by hammering over the tire at intervals to secure an acute-angled retaining ring. This system is known in Germany as "the Bûte fastening," and in England as the "Gibson." In the latter country the Mansell ring, where the surfaces are at right-angles to the strain, has been found the best, and is superseding the Gibson, which has been largely used.

The thickness of the tires running was as follows :					
2½	in.	and over	2½	in.	..... 205,246 tires.
2	"	and under	2	"	..... 318,356 "
1½	"	"	1½	"	..... 283,416 "
1¼	"	"	1¼	"	..... 141,680 "
1	"	"	1	"	..... 91,404 "
¾	"	"	¾	"	..... 49,722 "
⅝	"	"	⅝	"	..... 13,780 "
Below ⅝	in.				..... 626 "

One in 48 of the thinnest tires broke and 1 in 5,000 of the thickest.

The statistics show that the older the tire, the greater the liability to break. About 320,000 tires had been running from 13 to 20 years, and of these 1 in every 200 broke during 1886. The breakages decreased regularly with the age, and only one tire made in 1886 broke during that year.

A partial classification of the breakages due to defective material is as follows, giving breakages per 100 tires:

	Brittle material.		Defective and badly welded material.	
	1886	1885.	1886.	1885.
Cast steel	0.033	0.031	0.063	0.055
Puddled steel	0.014	0.013	0.062	0.721
Iron	0.005	0.006	0.384	0.306

In conclusion, it is remarked that, although these statistics show a commendable endeavor on the part of the railroad managements to reduce to a minimum the dangers incident upon breakages of tires, by timely discovery of flaws, introductions of the proper fastenings, and the use of better material for the tires, it remains nevertheless true that the number of breakages in the past year has been so great that the speedy abolition of the old-fashioned fastenings should be favorably considered, especially of those that require a hole bored completely through the tire, which are so conducive to breakage of the tire.

TABLE SHOWING BREAKAGES OF TIRES ON GERMAN RAILROADS, FOR YEAR 1886, WITH THE RELATIVE NUMBER OF BREAKAGES WITH EACH METHOD AND CLASS OF TIRE FASTENING.

FIG. <i>(See cuts.)</i>	Method of fastening tire.	Number of tires	Breakages.			
			No.	Per cent	Tire left wheel.	
					No.	Yes.
	A. Older means of fastenings:					
1.....	Rivet through tire.....	7,525	100	1.35	11	
2.....	Bolt through tire:					
a.....	Conical head.....	68,363	303	0.46	89	4
b.....	Cylindrical head.....	108,599	727	0.67	217	14
3.....	Tap bolt through tire.....	14,082	88	0.62	44	5
	Total 1, 2, 3.....	196,560	1,218	0.62	391	23
4.....	Tap bolt screwed in wheel and tire.....	92,250	700	0.76	335	21
5.....	" " tire only.....	283,584	1,574	0.56	740	106
6.....	" " wheel only.....	94,322	279	0.30	116	34
	Tap bolts, total 4, 5, 6.....	470,066	2,553	0.54	1,181	161
	Total of the older fastenings (1 to 6).....	666,625	3,771	0.57	1,542	184
	B. Modern fastenings:					
7.....	Central rib with bolts or rivets.....	1,058	20	1.89	1	
8.....	Single retaining ring and tap bolt.....	606	9	1.35	8	
9.....	Mansell retaining rings.....					
10.....	" " " "	56,472	27	0.10	10	1
11.....	Double clutch rings.....	175				
12.....	Mansell retaining ring; wood cushion wheels.....	71				
13.....	" " " " wood wheels.....	1,433	70	0.49	1	2
14.....	Internal flange, paper wheels.....	239	10	0.42	1	
15.....	Retaining ring and grooved flange on tire.....	506	10	1.18		
16.....	Ditto with additional key ring.....					
17.....	Spring ring and groove in tire.....	312,747	310	0.10	137	9
18.....	" " " " (System Bork).....	11,197	5	0.04	4	
19.....	" " " " (Patent Schüppaus).....	2				
20.....	" " " " and tap bolt.....	30,136	40	0.13	2	
21.....	Groove in tire and tap bolt.....	23,261	61	0.26	30	6
22.....	Groove and tire hammered over.....	1,110				
22a.....	" " with tap bolt.....	4				
23.....	Lead run in dovetail (Kaselowski).....	14,113	79	0.56	39	6
24.....	" " and groove in tire.....					
25.....	Piston ring, grooved tire (Hennig).....	214	31	1.40	1	1
26.....	Conical spring ring and grooved tire (Kessler).....	30	1	3.33		
27.....	Steel plate wheel (handyside).....	134				
28.....	Tire bored conical and grooved.....	8				
29.....	Tires welded to wheel.....	3,600	27	0.75	4	
30.....	Dovetail grooves in tire (Claus).....	210	2	0.95		
31.....	Double retaining plates, etc.....	4	1	2.50	1	
32.....	Tires cast on wheel.....	10	1			
33.....	Tires welded to wheel (Krupp).....	52				
	8 to 9 clutches.....	32				
	Tires shrunk on hot.....	284				
	Wheel and tires solid.....	170,914	155	0.09		
	Unknown.....	102,973	8			
	Total fastenings, 7 to 33, etc.....	701,830	759	0.11	265	25
	" " of 1 to 6, inclusive.....	666,635	3,771	0.57	1,542	184
	Grand total.....	1,368,465	4,530	0.33	1,807	209

NOTE.—The last two columns include only those cases where the breakage was of such a nature that with an inefficient tire fastening the tires might have left the wheel.



Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

It is reported that Receiver McNulta, of the Wabash, has taken the Commission at its word, and will interpret the fourth section for himself, and that he will interpret it on the lines of Judge Deady's recent decision. That is, he will make east-bound through rates from Peoria considerably less than the through rates from intermediate points at which competition is less. The Peoria rate, for instance, is 110 per cent. of the Chicago rate, while the Jacksonville rate is 120 per cent. of the Chicago rate, although Jacksonville is 88 miles from Peoria on the line of eastern traffic. Receiver McNulta takes the same ground regarding the eastern traffic from Chicago via Bement, and will make the Bement rate materially higher than the Chicago rate. Naturally this leads to complaint from the shippers at the points discriminated against, who discover that the provision of the law which was the most obvious to them, and from which they hoped the most is nullified. But General McNulta acts on the principle laid down by Judge Deady that "a railroad corporation has a right to live," and he would not find it hard to prove that his road cannot live if it must reduce rates at non-competing points proportionately to those which it must make at competitive points. He assumes, therefore, in effect, if he does not formulate it in words, that the circumstances and conditions are not substantially similar at competing points even when the competition is entirely between inland roads. The case is interesting, as it will undoubtedly lead to further judicial interpretation of the law; and it is interesting further as suggesting the difficulty which the state has in finding a stopping place when once it begins to take the management of railroads out of the hands of their owners. The roads were learning the uses of their own machinery in preventing ruinously high rates at one time and place, and ruinously low rates at another. They were learning the necessity of adjusting their relations to the people and to each other, and the means of adjustment. Congress by prohibiting pools destroyed the machinery which the railroads had devised, and now the process of adjustment must begin over again in the courts and before the Commissioners. As an appendix to the action of Receiver McNulta comes the decision of the representatives of a certain considerable group of Southern roads to make rates regardless of the fourth section in case of water competition. This limit will be hard to draw and to keep.

In another column will be found the circular issued by the Massachusetts Commissioners in reference to bridge inspection. It will be seen that the state does not assume responsibility for the bridges, nor will it undertake to inspect them. The responsibility is left entirely with the companies, where it belongs. The law will secure inspection, and, what is far better, the filing, where it may be seen by the public, of complete information about all railroad bridges of 10 ft. and upward. This is the first great step. The responsible officers knowing that all bridge structures will be subject to criticism at all times, in every detail, by any friend or enemy, may be left to themselves. Further surveillance can hardly ever do any good. But

the provision that the drawings of and reports on the structures shall be subject to the examination of the engineer of the board is wholesome. This examination will no doubt, with the engineer who has been chosen, be rigid and competent, and very likely it will often lead to criticisms and suggestions of value to the companies. It will be apt also to result in unearthing, here and there, an incompetent official or a faulty organization now unsuspected by the railroads. In short, this law and the provisions made by the commissioners for its execution may well be imitated in other states. It seems to fill the measure of legislation on this particular subject.

The account on another page of trades unions on English railroads is interesting as showing the friendly relations that exist between prominent public men and trades unions. That members of the British aristocracy and large employers of labor should serve as officers of a trades union will astonish many of our readers. The result, however, appears to be excellent. Acts of violence in railroad strikes are unknown, and strikes themselves infrequent, the last of any importance being a strike of freight conductors against payment by the trip or by the mile, instead of by the hour or day. Friendly intercourse between two classes, employers and employés, naturally tends to discourage violent measures, and leads each party to better understand the position and take a reasonable view of the situation. Thus we find the English trades unions conduct their disputes with railroads on a purely business basis, and when they fail to agree by means of correspondence or conference and consider their members unfairly treated, instead of stopping all traffic or tearing up tracks, they go to law just like other people. This common sense course secures the support of the general public. It is impossible to sympathize with men who seek to right their wrongs by acts of violence, and strikers are generally regarded as unreasonable beings, but no one can reasonably object to an effort to obtain a legal remedy. As half the public men of our time are or have been lawyers, they naturally sympathize with men who go to law, and this explains the adhesion of prominent public men to the Amalgamated Society. As the case is not one between an individual and a corporation, but between two corporations, the litigants can both afford to retain good counsel, and with an impartial tribunal can reasonably expect that the best man will win. Naturally questions of general advances or reductions of wages seldom arise between railroads and their employés. The most frequent and serious disputes arise, as in the great Southwestern strike, and in the present Brooklyn Elevated strike between an individual and a corporation. It is obvious that the latter class of differences can be better settled by a legal decision than the former, and in this railroads are fortunate. It is easier to get a large body of men to acquiesce in the justice of a decision affecting a portion only of their number, while it is difficult to convince any body of men that every one should suffer an immediate pecuniary loss.

The opening of the Sault Ste. Marie bridge will doubtless make some change in lines of east and west traffic. The Duluth, South Shore & Atlantic is now operating 246 miles, from Point St. Ignace to Houghton, and is building east and west to the Sault and to Duluth. The Minneapolis, Sault Ste Marie & Atlantic and Canadian Pacific are closing up the gaps east and west of the Sault, and the hope is to make a through line from Montreal to St. Paul and Minneapolis before winter. From Duluth to Montreal by this route is about 1,000 miles, against, say, 1,400 to New York via Chicago. From Minneapolis to Montreal, however, the distance is not materially less than to New York and Philadelphia. The element of distance, therefore, while it may affect the Duluth traffic, is not likely to affect that of Minneapolis and St. Paul. But the presence in the field of new lines wanting traffic may well make trouble for the older lines, and is a much more important consideration than the slight differences in distance. The Canadian Pacific, not to mention its new allies, will want business very badly. It is not unreasonable to expect, therefore, a considerable diversion of trade to the new route. As Montreal is not a winter port, however, the Canadian Pacific must seek an outlet on the coast, and whether that outlet is eventually Boston or Portland or Halifax cannot yet be foreseen. It seems most probable, however, that finally a large part of the Atlantic coast business of the Canadian Pacific will be done through Boston. The distance from Montreal to deep water is so much less by Boston than by Halifax, the concentration of money and trade is so very much greater at Boston, that it is hardly reasonable to look at Halifax as a serious competitor.

But diversion of trade by the Sault Ste. Marie and

Montreal to Boston means, of course, some loss to New York. This leads to the consideration of the growth of another railroad system, which also threatens to draw something from the trade of New York and Philadelphia. That is the system gradually consolidating as the Boston & Maine. This road, since its lease of the Boston & Lowell, controls some 1,200 miles of road pretty well covering the territory from the Canadian border to Portland and Boston, and west on the latitude of Boston, to the Connecticut River. There are various possible connections with the Canadian Pacific, and it is not at all unlikely that by the projected "Northern Extension" such connection will shortly be made independently of any uncontrolled line. It has been said that the Central Massachusetts, now controlled by the Boston & Maine, through its lease of the Boston & Lowell, will be built to Holyoke this year, and the latest story is that it will reach Northampton by Oct. 1, and that a line will be built from Westfield to Boston Corners, giving a direct connection to the Poughkeepsie Bridge. Quite as likely a connection, however, is by Springfield and Tariffville and the Hartford & Connecticut Western. But in any event, it is on the cards that the Boston & Maine by traffic agreements will reach the Hudson River at Poughkeepsie about the time of the completion of the bridge. Boston, in spite of the early alarm about the effect on her export business of the Inter-state Commerce law, may reasonably hope therefore to still get a fair share of trade. There are complications, however, in the plans of the Boston & Maine, which affect its northern connections. On one hand it is held that the lease of the Northern of New Hampshire to the Boston & Lowell for 99 years is invalid, because of the dissent of certain stockholders. On the other hand it is held that the lease of the Boston, Concord & Montreal to the Boston & Lowell, likewise for 99 years, cannot by its terms be transferred to the Boston & Maine. A bill, known as the Hazen bill, is now pending in the New Hampshire Legislature, by which the Boston & Maine hopes to get relief from both of these difficulties, and an appeal has been taken to the United States courts from the decision of the state courts. The struggle for the control of the leased roads is very bitter, and much is made of the argument that it should not go to foreign roads; "foreign" roads meaning, of course, other than those supposed to be New Hampshire roads. Whatever the immediate results, the gradual consolidation of the small New England roads will probably not be greatly delayed. Of this consolidation the case under consideration is a striking example. The resulting Boston & Maine system is made up of at least 28 leased lines, and of some 1,200 miles in the system there are but 124 of the original Boston & Maine and its branches.

"Cars at home move all right. If the service of cars at home was carefully examined and comparison made with the service of cars away from home, it would be found that the service of those away from home, of which there is so much complaint, is generally as good as the service of those at home. With the constant increase in equipment the average daily mileage of cars has decreased, and this is mainly attributed to the detentions on foreign rails, but this can hardly be the case in view of the fact that 70 per cent. of the equipment of railroad companies is generally at home, and also that the same system of car service regulating the movement of home cars regulates the movement of foreign cars. The adoption of a per diem charge for the use of foreign cars will have no effect on the movement of the home cars."

The above from the *Official Equipment Guide* expresses a generally acknowledged fact. Roads have not only built cars to be rusted and weather-beaten on their neighbors' side tracks, but have in many cases ordered new supplies, as though cars were as cheap as hand-sleds, to stand idle by scores on their own track. As concerns the effectiveness of the proposed remedy, the writer in the *Railroad Gazette* of May 27 (page 345) seems to have stated the vital point in the case. Your own cars earning wages all the time they are absent need cause no anxiety whatever; foreign cars in your hands being a constant source of expense will receive close attention. Now, foreign and local cars being intermingled on all parts of the road, the latter can hardly fail to receive benefit from the improved watchfulness bestowed upon the former. An officer could, indeed, take pains to overlook all his own cars; but naturally he would treat all alike. If train conductors, or switching gangs, or freight-house men were spurred to greater alertness, the rule would naturally apply to all cars alike; if consignees were made to pay for use of cars in bulk-freight service, not only ought they to pay the same price for all kinds of cars, but it would be absolutely necessary for the charges to be uniform in

order to avoid injustice. If a company had a considerable surplus of local cars it would naturally apply all the "rushing" to foreign cars; but as soon as the stock should become reduced to a reasonable number the motive for keeping the cars moving would be the same as toward foreigners, for every idle local car would necessitate the hiring of a foreign car at some point. The editorial quoted from above complains that the union and intimacy between the office which controls car movement and the one that keeps the record of the movement is not close enough to be efficient. If the superintendent had the realizing sense that the car accountant does concerning evils and abuses, he would be more active in efforts to remove them; or if the accountant had the authority which is given only to the superintendent he would improve matters.

Tire Fastenings.

A recent article in these columns, pointing out the danger of drilling holes within $\frac{1}{8}$ in. of the edge of a central rib in a steel tire has aroused the wrath of a contemporary, which strenuously contends that tires do not always break through the holes, and that the Mansell fastening has the fatal objection of being English, you know. Such childish arguments hardly deserve notice, and but serve to show the weakness of the case for the central rib as a safety tire fastening.

The worth of inventions depends upon their mechanical fitness and record in actual practice rather than their nationality, and if we are to discard every railroad appliance that originated in England, we shall have to begin with the locomotive, and include iron bridges, welded tires, steel rails, the link motion and many other essential features of a modern railroad in an index expurgatoris.

We may, however, be permitted to repeat, 1, that a hole drilled near the edge of a steel tension member is a source of danger; 2, that the Mansell fastening is free from that danger, and 3, that in the event of the tire breaking in one or more places the retaining rings will hold the tire in place and thereby prevent a disastrous accident. All these facts have been amply proved, not only in the writer's personal experience, but by carefully kept records extending over twenty years and referring to something approaching 1,600,000 wheels. Any idea that these wheels are more lightly loaded than those used in this country is certainly unfounded as regards France and Germany, where the Mansell fastening has been thoroughly tested, and a few figures will show that the average weight per passenger car axle does not differ greatly in Great Britain. The standard Pennsylvania passenger car weighs about 42,000 lbs., and is carried on four axles, while the heaviest Pullman or Manu sleeping car weighs about 71,000 lbs. and is carried on six axles. The weight per axle thus varies from 10,500 lbs to nearly 12,000 lbs. An ordinary English rigid wheel base carriage is carried on three axles and weighs from 24,000 lbs. to 33,000 lbs., the weight per axle thus varying from 8,000 lbs. to 11,000 lbs. Whether this difference is or is not offset by the higher speeds on English railroads is a matter of opinion, but as the Mansell fastening is also successfully used on thousands of engine and tender wheels loaded up to 33,000 lbs. per axle it is evidently a safe and efficient fastening under the heaviest service.

A few statistics will show the difference in the results obtained with different forms of tire fastenings. The broken tires with a central rib, illustrated in a recent article,* were used on a prominent Western railroad under passenger equipment.

Four tires out of 408 in service broke during the winter months. Consequently the number of breakages within a year was one tire out of every 102 running, supposing the breakages to have been equal at all seasons. This, however, is not precisely true, and the proportion given may be somewhat too large, but still is sufficiently near the truth for illustration. The number of steel tires used in the United States is still comparatively small, and the data as to their performance have not been collected in useful shape, so that however reluctant one may feel to going abroad to learn, still in this weather he is driven to it. Therefore the figures given above may be contrasted with those given below from the British Board of Trade Returns for the year 1886.

	No. tires broken.	No. vehicles.	Average No. wheels per vehicle.	Proportion of broken tires.
Engine.....	18	15,196	7	1 in 5,909
Tender.....	6	?	6	?
Passenger car.....	20	33,658	6	1 in 10,097
Baggage car, etc.....	18	24,734(?)	5	1 in 6,870
Freight car.....	218	461,153	4	1 in 8,517
Freight car, private owners.....	586	?	?	?

It may be added that less than 25 per cent. of these tires broke clear across, for in a great majority of cases the failures were with iron tires, which developed circumferential splits and bulged, just as the old iron rails used to split and broom from defective welds in piling. Only ten tires in all left the wheels, a tolerable proof of the efficiency of the fastenings.

The statistics on the German railroads for the year 1886 based on the results obtained with 1,368,465 wheels show on the whole a considerably higher proportion of breakages than on English railroads. The total number of wheels known to have separate tires is given as 1,094,576, and with these wheels 4,367 breakages of tires occurred during the year, or a proportion of 1 in 251. On the English railroads the total number of wheels (omitting those on tenders and "private owners' wagons," the numbers of which are not given) was 2,287,302, and on these 274 breakages of tires occurred, or 1 in 8,349. Unfortunately the English return is far less detailed than the German and does not show clearly the relative value of different methods of fastening. It does, however, show that almost perfect immunity from broken tires can be secured. This should encourage us to use greater care and the best known appliances.

The German returns show that wheels with a tire fastening on the Mansell, Gibson* or Carlton principle, in which no hole is bored in the tire, that only one tire in 1,008 failed. Tires with central ribs pierced by bolt holes failed far more frequently. There were 1,297 wheels so fitted, and 21 failures occurred, or 1 in 62. This enormous difference fully justifies the strong preference expressed by Herr Krupp and other German authorities for the Mansell fastening.

Is there, therefore, any reason why we should continue to use a form of fastening which has proved defective, or, at any rate, inferior to other forms? The central rib is not a new thing. It is at least 34 years old, as it is clearly shown in a patent granted to Charles de Bergue, July 4, 1853, and any idea that the invention is American is fallacious, as the inventor happened to be a Frenchman, domiciled in England. On the other hand, as the patent on the Mansell fastening has expired, there seems no reason why its use should imply preference for the products of any one particular firm and, in fact, wheels with the Mansell fastening are now being sold in this country by several prominent firms.

The international question is this, are we content to acknowledge our inferiority to English and German railroads in the matter of safety appliances to such an extent as to use a form of tire fastening which long experience has shown is not the best?

The Elevated Railroads of New York.

Below will be found some statistics of the Manhattan Railway Co., which operates the elevated lines in New York city. The facts are not new or startling, but, nevertheless, are, in many respects, worthy of note as showing the arrangement and system necessary on a double track road which is worked up to somewhere near its ultimate capacity, and the variety and multitude of workers that can be concentrated on 34 miles of road. Many of the regular aristocracy of American railroads look somewhat contemptuously on the Elevated, and deem it, along with the horse railroads, as beneath their notice. It is, to be sure, prevented by circumstances from running trains at high speed, and in the line of heavy trains and variety of traffic it cannot boast of great things; but it is not to be laughed down, and the railroader who thinks he has nothing to learn from it, or that a cheap order of talent can successfully manage it, has made a mistake. The enormous amount of business done would tax a road much more favorably situated, and the fact that certain circumstances render the work easier than it would be on an ordinary road, does not weaken the conviction that the latter can here learn much better than anywhere else a great many things about the best way of doing their own work. The elevated has more employees than the New York, New Haven & Hartford, and has nearly ten times as many per mile as the New York Central; and in several departments has a list of spare or supernumerary men larger than the regular force on many roads of considerable importance.

LIST OF EMPLOYEES IN MAINTENANCE OF WAY DEPARTMENT, MANHATTAN RAILWAY.

Engineer's Office.	
Chief Engineer.....	1
Assistant engineer.....	2
Miscellaneous.....	5
	8

Department of Building Repairs.	
Foreman building repairs.....	1
Carpenters.....	32
Pipe fitter.....	1
Lamp trimmer.....	2
Repairs meters, etc.....	1
Miscellaneous.....	37
	74

* This fastening is shown on fig 19, and is largely used in Germany, where the invention is ascribed to a well-known German Superintendent of Motive Power, Herr Bübe. An apparently identical fastening was patented by John Gibson in 1854, and was largely used on English roads until superseded by the Mansell and Carlton fastenings.

Roadmaster's Department.	
Roadmaster.....	1
Assistant roadmaster.....	1
Track foremen.....	10
Track repair men.....	110
Track walkers.....	15
Track carpenters.....	6
Yardmen.....	13
Night trackmen.....	11
Night track foreman.....	1
Drip pan cleaners.....	4
Lamp trimmers, switch and signal.....	3
Riveters.....	81
Inspector rivets and girders.....	6
Charge interlocking switches.....	16
Watchmen.....	3
Switch watchmen, interlocking.....	12
Pipe fitters.....	13
Painters.....	33
Miscellaneous.....	26
	365
Department of Street Repairs.	
Foreman street repairs.....	1
Paver.....	2
Laborers.....	21
Mason.....	1
	25
Total M. W. Dept.....	479
GENERAL TICKET DEPARTMENT.	
Agents, regular.....	291
Agents, regular, extra.....	1
Agents, irregular, extra.....	19
Clerks.....	13
Collectors.....	5
Examiners of acc'ts.....	1
Gatemen, regular.....	300
Gatemen, irregular, extra.....	122
General ticket agent.....	1
Platform men.....	70
Porters, regular.....	112
Porters, irregular.....	20
Station inspectors, day.....	4
Station inspectors, night.....	3
Reserve inspectors.....	1
Miscellaneous.....	15
	978
TRANSPORTATION DEPARTMENT.	
Car couplers.....	62
Conductors, regular.....	258
Conductors, irregular.....	18
Dispatchers.....	22
Flagmen.....	26
Guards, regular.....	605
Guards, irregular.....	133
Hand switchmen.....	54
Superintendent.....	1
Telegraph operators.....	31
Tower switchmen.....	72
Trainmasters.....	2
Assistant trainmasters.....	3
Miscellaneous.....	35
	1,322
MECHANICAL DEPARTMENT.	
Blacksmiths.....	20
Boiler-makers.....	15
Carpenters.....	52
Car cleaners.....	152
Car inspectors.....	77
Coal tenders.....	71
Engine dispatchers.....	5
Engine inspectors.....	5
Engineers, regular.....	353
Engineers, irregular.....	18
Firemen, regular.....	365
Firemen, irregular.....	43
Engine hostlers.....	64
Engine wipers.....	59
Lamp trimmers.....	51
Machinists.....	99
Machinists' apprentices.....	7
Mast r mechanic.....	1
Painters.....	48
Pipe fitters.....	2
Road foremen.....	2
Stationary engineers.....	28
Water tenders.....	22
Miscellaneous.....	255
	1,814
Total in all departments.....	4,586

MAINTENANCE OF WAY DEPARTMENT.

The first table shows the employees in the road department. The work of this department has been heretofore referred to in these columns, and its remarkable performance in rail renewing will be recalled by our readers. The officers naturally have constantly in view further progress toward perfection; and the record of a few years ago has been improved on. With a gang of eighteen men, sixty rails have been renewed in 70 minutes, those taken out weighing 50 and the new ones 70 lbs. per yard. Eight men lift in and out, four pull spikes, two adjust the joint fastenings, and there are four spikers. The guard timbers, which, as every one knows, extend the whole length of the road on both sides of each rail, are from four to six inches higher than the rail, and blocks that just fit between the rail and the timber are kept always at hand, so that if an approaching train comes up a few seconds earlier than it is expected the track can be made solid and safe (the maximum speed being 25 miles an hour) without spiking. On the inside of the rail the spikes are not drawn, so that the blocks are always placed on the outside where the wheel flanges will not be interfered with. A frog and the two sharpened rails for a switch are put in, on occasion, in 3 $\frac{1}{4}$ minutes. This is about the maximum time between trains in the daytime. The perfection of the system and the satisfactory manner of its working may be inferred from the fact that on the Ninth avenue line, where no trains are run at night, the track work is all done in the daytime, the same as on the lines where trains run all night. The unloading of rails, which is made wholly automatic by means of rollers and an inclined plane at the end of a platform car, is done for a long stretch of track between two passenger trains, which are only four minutes apart, and without halting. The Fisher joint has been tried for about two years, and has been in use on a mile of the Sixth avenue line for a year. It gives very satisfactory results.

The reader will readily guess that this sort of work, all done on a narrow bridge, is not accomplished with a gang of the ordinary kind. The forces are not recruited from passing tramps or the refuse that have been rejected as farm hands. Applicants are rigidly examined, and no chances are taken. Men who are too old to learn or too young to be cautious, or whose health or habits are likely to cause trouble, are rejected. They receive \$2 to \$2.25 per day, and generally take an interest in the work, and look for promotion. It is a rule that each man must look to his own safety; with such numerous trains no other would be practicable. Carefully arranged "civil service" rules have to be observed even in this department. Before being a foreman a repairman must have served as a "floating trackman," so as to become acquainted with other sections than his own; a track walker for a year; a yardman (looking after switches, lamps, etc.) for a year; a sub-foreman; and have an experience of six months with the "structure gang" which attends to the iron work below the sleepers. All the men are under strict supervision, it being possible, at any time, day or night, to communicate from the road master's office to any man on the road within ten minutes, two daily reports being made by each foreman. This strictness is not maintained, however, by a rod of iron, but by the more sensible method of treating the employees like intelligent men. Slight lapses are not severely punished, and any reasonable request for a short absence is freely granted, time being "docked" only

* See page 403, Railroad Gazette, June 17, 1887.

† This figure has been assumed, and though only approximately correct does not deduct from the force of the comparison.

where there is a real necessity for it. All the men working the month have a 10 days' vacation in the summer without a deduction from their pay. As noted above, the roadmaster's office is open day and night, and, as will be seen by the list, a force of men has to be on duty on the road all night as well as through the day. If an interlocking machine gives out in any part, the "yardman" must be prepared to act in conjunction with the towerman without the least delay. Canvas covers are used to obscure the signals whenever they have to be disconnected, and the trackman has to act as a flag-signaler for the towerman until the apparatus is restored. The Manhattan has fourteen wrecking outfits, besides a large amount of material and tools for use on the street level in changing foundations, etc. This latter is an important department in itself. There is always more or less building and excavating going on which endangers the foundations of the columns, and the six inspectors who are constantly patrolling the road have to keep a vigilant watch for contractors' and builders' operations of all sorts, besides attending to their regular duty of watching the iron work. The latter has on the Third avenue line alone about 2½ million rivets. The high state of perfection in which the track is kept is not wholly on account of the great train mileage, but is necessitated also by the ill effect on these rivets of any undue jar. A worn frog will be safe even for the immense traffic of this road for a year or two after the pounding is serious enough to make constant trouble for the structure inspectors.

As is well-known, the trackmen have to keep themselves supplied with danger and caution signals, so as to act as signalmen to the trains in case of fog. The trains being all run as though in a yard, that is, with no rights to the road at any point except as far as the runner can see ahead, renders the use of an ordinary system of block signals of doubtful availability, as with very frequent trains many of them have to be run "under control" for a large portion of their whole trip. The principle on which the "fogmen" work is to double the length of view of the runner; assuming that a train or flag can be seen 400 ft. distant, the man, when a passing train has gone out of sight, signals "all clear" 400 ft. in the direction of the following train, so that the next engineman is assured of 800 ft. clear road, which often is all he wants. In very dense fogs the man can only advise runners as to the time elapsed since the passage of the preceding train. On the curves and most important portions of the road, simple distant signals worked by hand are provided so that the man can show either "danger" or "clear" about 500 to 800 ft. in advance of where he stands. These signals must not be distant from the lever by which they are worked much farther than a man can see (in the fog) plus the length of a train, for if they were there would be a possibility of the man's showing "all clear" while a train was yet between him and the signal, there being no telegraphic connection between the men.

The 13 pipe fitters are engaged upon the drain pipes of the drip pans; of these latter there are about 500, to prevent the dripping of water into the street from steam-pipe connections and from engines. These pans average 8 x 40 ft. superficial area. Of the large number of riveters most are engaged upon new work, girders for middle tracks being in process of erection for considerable lengths on the Third avenue line. Pipe felters look after the coverings of the water cranes, these being all heavily packed to withstand the frosts of winter. As noted above, the 25 men in the street repair department are constantly engaged in putting up and taking down trestles, resetting foundations and other work necessitated by abutments' operations.

There are on all the lines over 400 switches and 20 towers with interlocking machines.

Reference to other departments will have to be deferred to a future number.

Uniforming of Employees.

A newspaper paragraph states that the employés of a certain prominent road are complaining loudly because their summer uniforms were not provided in season and were very high priced when they at last did come, and that as a final exasperating straw each man's suit came in a separate package with an express charge upon it. This is a sample of more or less of similar grumbling in various quarters which, while often unreasonable in many respects, still should not go unnoticed. Railroad employés are constantly looking at comparatively little things, and judging by them concerning the attitude of "capital" towards "labor;" and roads should not be careless even in the straws which they expose to the winds. The uniforming of men involves various considerations. The original idea is to render employés easily distinguishable by the public; but with the prevailing dark blue cloth this object is accomplished chiefly by the badge, cap-band and buttons, so that the utility of the uniform coat and trousers is chiefly in its promotion of good taste and regard for the fitness of things by preventing the use of extravagant shapes or colors. The public never notice whether a man's coat is two shades too dark or as much too light, or whether the cloth is plain or twilled, diagonal or sand-papered, and a ready-made garment with a dollar's worth of work in the lining is as satisfactory to them as one in which ten times that amount is sewed. As the difference between one coat and another, both as regards value to the wearer and tidiness of appearance, depends largely upon the care taken of them, it would seem no more than reasonable that employés be allowed some discretion as to how much they shall pay for their clothes.

The point, as just noted, is the avoidance of untidiness and

bad taste, and that can be accomplished even with a variety of styles of both coat and cloth, while with the strictest uniformity of make not only may this object be defeated, but the road actually disgraced. On some roads whose uniforms are apparently all cast in one inflexible mold may be seen men in all degrees of dilapidation, and trainmen's garments are often so badly smoked and greasy as to be more black than blue. The true way, therefore, would appear to be to have better inspection; to see what the men wear as well as what they buy. An untidy fellow will succeed in looking as shabby in a thirty dollar suit as in a ten dollar one; and a neat person will make a creditable appearance in any grade of goods. For this reason and on account of the penuriousness or economical notions of some men, the requirement that a new suit shall be bought once in a certain number of months is a very imperfect provision.

It may be said that the present general practice is a great improvement over the old way, and that such close surveillance as would dictate when a new binding should be put upon a vest pocket, or judicially decide when bagginess of knees had passed beyond the point of toleration would be destructive of men's self respect; but it is to be borne in mind that uniforming a man draws to him attention which he otherwise would not have received, and that therefore he should present a better appearance than would have been tolerable under the old régime; and a road's duty to itself demands that it have men whose appearance is creditable to it, whether as a result of compulsion or otherwise.

The English roads furnish uniforms for their men free, though, of course, the rate of wages is calculated accordingly. If, before the time arrives for a new suit, a man wears out his clothes to such an extent that they fail to meet the inspector's requirements, extra garments are sold him at a low rate—half cost, we believe. This is a sensible way of inducing a proper degree of pride in personal appearance, and worthy of attention, if not imitation, in this country. The English system could not very well be adopted by every road without reducing wages, and that would only make matters worse; but those roads which wish to celebrate the business boom by increasing their men's pay could do it in a graceful way by making presents of suits of clothes. Certainly, if men are to be compelled to buy through the company and to get a better quality than men of fair judgment think they can afford, it would not be a violent stretch of benevolence to reduce the cost to an equality with ready-made clothing, and to give the employés the benefit of any doubt on this point. By granting substantial favors to employés in the supplying of their apparel a company places itself in a position to demand a high degree of tidiness in their appearance.

The strike of locomotive engineers on the Brooklyn Elevated is on a very small road, and derives importance chiefly from the facts that the strikers are respectable so far as concerns numbers, there being over forty of them, and that they cause a good deal of discomfort to many individuals. It is alleged that two or three men were unjustly discharged for running by red signals, and there is talk about the pay of both runners and firemen, but the formal demands of the strikers and the real causes of their action seem to be somewhat indefinite. One of the men is reported as saying that their real grievance is that the master mechanic is an enemy of the Brotherhood, and is working to drive off the road its members, and it is quite commonly said that this officer is habitually impatient and overbearing in his relations with the men. If that is true he is evidently unfit for his place. Few bodies of workmen can be successfully dealt with now by bullying, and least of all the locomotive engineers. They are a class who know their rights and the degree of respect due them, and generally manage to secure them. On the other hand they are too intelligent to adopt the rude trade union tactics which they seem to have used in this case. They should, with their powerful organization, realize the impolicy of exasperating public opinion by subjecting a whole community to the inconvenience of such a strike as that in which they are now engaged. With the Brotherhood such a course can hardly be considered necessary even as a "war measure," and it is sure to react upon them. All the recent history of their organization has gone to teach that the interests of employers, employed and the public served are all promoted by strong unions of workmen, well managed, with decent systems of accounting, and with a cultivated sense of responsibility, both civic and financial. It is a misfortune for any of their number to do anything to lessen the confidence which the public were learning to feel in their sense as citizens. The road has been criticised for trying to run trains with incompetent men. Perhaps this criticism is just, and perhaps it is not. Not enough of the facts in the case are known to enable any one to pass intelligent judgment on this point; but all who are familiar with the methods of strikes will understand how difficult it is to prevent the locomotives being manned by those who sympathize with the strikers, and who will try to impede traffic and to alarm the public. This is a well-known trick. For officers, the lesson of the affair should be to remit no effort to cultivate in the men the feeling that the differences with their employers are to be discussed and settled in a business-like way and not gone to war about. With good temper, patience and readiness to reason and to compromise on both sides, these disturbances can seldom arise. Unfortunately this state of mind can only come to the men with confidence in their own power, and only to the employers after the strength of the men has been proved in wasteful conflicts.

The Canadian Pacific and allied interests are meeting with opposition from the Peninsular & Oriental Steamship Com-

pany to their plan of obtaining a \$500,000 subsidy for a line of steamers between Japan and their Pacific terminus.

The Peninsular & Oriental line, which was started about 1825, though not incorporated till 1840, and now has a paid-up capital of £2,900,000, on which it pays from 6 to 8 per cent., is very firmly entrenched in British mercantile and banking interests, besides the influence of its stockholders. It extends its lines to Japan and objects with all its force to subsidizing an opposition line, in which it is seconded by the influence of London, from which port its steamers sail. The Canadian subsidy, however, is strongly backed by Liverpool, which, rather than London, will be the port for any trade through Canada.

Although the weight of influence and interest is strongly in favor of the Peninsular & Oriental, it is possible if not probable that the Canadian line will get its desired subsidy, as the intention of Russia to build through Siberia to the Pacific Ocean is alarming England, for both its political and commercial influence in the North Pacific, and the advantages to their trade in peace as well as to their supremacy in war, which will accrue from the possession of a fleet of passenger steamers in those waters, particularly as their presence will tend to keep others away, which might prove inconvenient, will doubtless present arguments sufficiently strong to carry the point in favor of the Canadians.

The English cattle companies in the United States, according to the *Railway News*, have a capital of \$17,501,125 and control 2,275,100 acres of land, reporting 598,703 head of cattle in 1886.

The names of the companies, etc., are given below:

Name of company.	Capital.	No. of acres.	No. of cattle.
Prairie Cattle	\$3,000,000	138,345	97,439
Texas Land and Cattle	1,500,000	288,174	69,250
Swan Land and Cattle	4,500,000	371,494	113,625
Western Ranches, Limited	560,000	50,009	17,887
Cedar Valley Land and Cattle	750,000	74,797	25,129
Arkansas Valley Land and Cattle	825,000	16,023	25,268
Western Land and Cattle	1,000,000	20,060	32,558
Hansford Land and Cattle	1,000,000	77,380	27,006
Matador Land and Cattle	1,500,000	435,338	95,066
Espeula Land and Cattle	2,500,000	300,000	35,000
American Pastoral	866,125	304,532	45,483
Totals	\$17,501,125	2,275,100	598,703

All of the above companies except the Western Land and Cattle and the Arkansas Valley, which are administered in London, are Scotch companies. The two most successful companies are the Texas Land and Cattle, which has paid dividends of 15, 12½, 8 and 5 per cent., and the Western Land and Cattle, which has paid 20, 15 and 7½. In addition to the companies mentioned above, are the Cattle Ranch and Land Co., English, capital £205,600; the California Pastoral, capital £260,000, and the Missouri Land and Live Stock Co., capital £150,000; the two last are Scotch.

The New Haven & Derby, which has furnished an item for the newspapers nearly every day for several weeks, has finally passed to the control of the New York & New England by the sale of the city of New Haven's bonds to parties in that interest. An offer for these bonds from the New York, New Haven & Hartford, higher than the one accepted, was refused on the ground that the interests of the city demand that a rail outlet from the city not under the latter road's control be maintained. Until the New York & New England and the New York, New Haven & Hartford consolidate this will be successful; though the value of a road to Ansonia or even to the Hudson River via Hawleyville as a controller of prices on any important staple in New Haven under present conditions is somewhat problematical. If the New England ever gets a good passenger connection into New York City this line might be the means of giving New Haven the advantage of it. An injunction restraining the city from consummating the sale, has been asked for.

The current number of the *Railroad and Engineering Journal* contains an article on Technical Education on the Baltimore & Ohio, which starts with Dr. Barnard's report as a text. As this report was some months ago published, reprinted, abstracted and commented on by most editors, who supposed it could have possible interest to their readers, it has an air of ancient history now; and probably the editorial in the *Journal* has been read only by those who know how its editor adorns whatever he touches and by the charm of his style entices men into reading even about car-couplers. It will be remembered by some of the elders that in the old ring days of New York, a big steal was got through under the title of An Ordinance Concerning Pumps. So the editor of the *Engineering Journal* has worked off under the innocent title which he has chosen, a discourse on the Baltimore & Ohio's Purchasing Agent, and it is a lively article too.

The elevated railroads of New York City, which have been more or less pooh-poohed as not worthy to associate with regular, dignified, old-fashioned railroads, now appear in the *Official Guide*, and may safely be regarded as a full fledged line. In the nature of things there can be no time-table (without enlarging the *Guide*), but there is a full list of stations, distances, time and connections, and information as to the frequency of trains by which the traveler can fully post himself. There is a very clear, full page map which enables the most ignorant stranger to get all his bearings at a glance. The gauge of the road is not shown in the usual place in the *Guide*, and we are afraid the editor is in doubt about it, and, perhaps, has been influenced by floating impressions or otherwise to class it with the Sandy River or Bridgton & Saco River.

Florida travel, which at this writing is not particularly heavy, the temperature in the north having been for a week

quite favorable to alligators and their kind, is to be royally provided for next winter. The Atlantic Coast Line announces that it, in connection with the Pennsylvania, is now having built for the New York and Jacksonville service a special vestibuled train, consisting of baggage, smoking and library, dining and sleeping cars, which will be heated by steam and lighted by electricity. The time between the two cities is to be reduced to 18½ hours. Vestibules are becoming so popular that the road that is not provided with at least a sample train will soon be badly behind the times.

It is stated that Col. Hain went last week to Altoona to examine the petroleum-burning locomotive with which the Pennsylvania is experimenting there, and has ordered two of the Elevated locomotives to be fitted with the same apparatus. It is said also that more than a dozen methods of firing with petroleum have been tried on the Elevated in the last four years. The results of the Pennsylvania experiments were given at considerable length in the *Railroad Gazette* of the 1st inst.

Mr. M. N. Forney has sent in his resignation as Secretary of the Master Car-Builders' Association, to take effect Jan. 1, 1888, or sooner if the Executive Committee appoint a successor sooner. It is not necessary to say a word about Mr. Forney's services to the Association or to the railroads in all the years that he has held the office. They are a matter of record, and are a part of the history of railroad development in this country. It is to be hoped that the resignation will not be accepted.

The railroad law passed at the special session of the Missouri Legislature just closed provides for a board of railroad commissioners to be chosen by the people, and gives the board full authority to make reasonable rates. Pooling, unjust discrimination, rebates, extortion and the charging of more for hauling a short than a long distance are to be punished by fines amounting to \$5,000. The commissioners are given power to enforce the law.

Some weeks ago the *Railroad Gazette* suggested that the natural and obvious preventive of passenger-train robberies was the shotgun. It appears that arrangements have been made in Texas to issue to certain of the train hands warrants as "rangers," and arm them. The presence at the door of the express car, of an inquisitive messenger with a breakdown shot gun in his hands, and a couple of extra cartridges in his mouth, will work wonders. The *Galveston News* suggests that the rewards offered for the detection and arrest of train robbers are large enough to secure for the railroads some of the best fighting talent in the state.

The Baltimore & Ohio sale still drags along in the newspapers. It is now said that Messrs. Ives and Stayner have contracted to buy from Mr. Garrett stock (Baltimore & Ohio and other) to the amount of \$19,000,000, and have paid in \$120,000 and deposited as a pledge 15,800 shares of Cincinnati, Hamilton & Dayton preferred. Mr. Gould is now the customer to whom Messrs. Ives and Stayner propose to sell the property.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887 is given in the current number of the *Railroad Gazette* as follows:

Fairchild & Mississippi River, from Fairchild to Osseo, Wis., 15 miles.

Denver, Memphis & Atlantic, for the month of June, 82 miles.

Georgia Pacific, since Jan. 1, 39 miles; hitherto unreported, 9 miles.

Kansas City, Memphis & Birmingham, during the month of June, 32 miles.

St. Paul, Minneapolis & Manitoba, since Jan. 1 353 miles; hitherto unreported, 116 miles.

San Antonio & Aransas Pass, since Jan. 1 track has been laid as follows: San Antonio, Tex., to Boerne, 31 miles; Gregory to Ingleside, 13 miles; Yorktown to Wallis, 106 miles; total, 150 miles; hitherto unreported, 110 miles.

Trinidad, to a connection with the Denver & Rio Grande in Colorado, 5 miles.

This is a total of 369 miles for the week, making 2,351 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

Miles.	Miles.	Miles.	Miles.	Miles.
1887.....2,351	1883.....2,558	1879.....1,083	1875.....518	
1886.....1,772	1882.....5,100	1878.....819	1874.....727	
1885.....1,157	1881.....2,563	1877.....731	1873.....1,696	
1884.....1,519	1880.....2,375	1876.....932	1872.....3,159	

This statement covers main track only, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

Buchanan's Tables of Squares, containing the square of every foot, inch and sixteenth of an inch, from 1-16 in. up to 50 ft., by E. E. Buchanan. Published by E. E. Buchanan, Athens, Pa. Price, \$3. For sale also by E. & F. N. Spon, New York.

This is a handy little volume, of convenient size for the pocket, containing 102 pages. The squares are given to eight places of decimals. Two pages are devoted to tables of the decimal part of a foot for each inch and thirty-second.

The Transactions of the American Society of Civil Engineers for May contains a paper on Formulas for the Weights of Bridges, by Prof. A. J. Du Bois, and a Discussion by several members of the society.

The Journal of the Engineering Society of Lehigh University contains articles on Topographical Work on a Rail-

road Survey, and the Soda Engine of Mr. Honigmann, and a report of the trial of Steam Heating Boilers of Lehigh University.

The Maverick National Bank Manual is a convenient little statistical manual containing essays on public debts and credits, securities, banks, coinages, railroads, and various forms of investments, with interesting tables on a great variety of subjects.

Foreign Railroad Notes.

THE PROBLEM IN RUSSIA.

Before the Crimean war, Russian railroads had been built and managed by the state. In the impulse to new construction following that war, the weakness of the treasury led to a change of policy. Construction and management were now to be private, and the state was to guarantee interest on securities. In 1880 the evils of this system had proved such that the state resumed the building of new lines, and bought out three of the existing private roads. The present state of things calls out great complaint from the press and has given occasion for various special treatises. The most recent of these, on "Russian Railroads and their Weak Points," by Engineer Dobrynin, formerly state inspector of railroads, gives a most discouraging picture. The state outlay for private roads, including 5½ per cent. interest on the debt owed by these roads to the state, is growing year by year. Mr. Dobrynin estimates that unless a change of policy is made, by the most favorable calculations the outlay for the year 1890 will be \$110,886,000, and the whole debt at that time will reach the enormous sum of \$1,407,313,000, and by the year 1900 it will be \$2,913,510,000. The cause for this state of things he finds in the system of chartering private companies. The mischievous scheme of guaranteeing interest relieves the companies of all immediate concern in building and managing economically. On the contrary, it has been to their interest to make the cost as high as possible, to give greater room for corruption. Consequently the roads have been built always extravagantly, and often too well for the needs of the traffic. When they were once in operation the means for new construction and equipment was taken out of earnings instead of being borrowed, as by this means the company incurred no new debt, and the only result was a greater deficiency of interest to be made up to stock and bondholders by the state. Against this latter form of overreaching the state, the government inspection boards have proved no safeguard. Their activity has been too much confined to merely technical matters, and to securing a formal uprightness of management. Like some other railroad commissions, they have shown a tendency to exercise oversight in the sense of overlooking.

The writer asks for more thorough state supervision, but this cannot be realized without the change of many statutes and provisions which now tie the hands of the state. His other remedies seem shortsighted and inefficient. They consist of various petty savings from lowering the weight of locomotives and rails, an increased use of wood in construction, in place of iron and stone; a substitution of mixed passenger and freight trains for the present system in which the two are separated, and a consequent lessening of the number of trains; a general lowering of speed, and the like.

There is a widespread feeling in favor of state assumption of the private roads, but this is impracticable for two reasons. The state has not the means to buy the roads, and if it had, many provisions in the charters would stand in the way. On the whole, the question in Russia is a grave one, and complicated by earlier imprudence.

THE NETHERLANDS RAILROADS IN 1885.

According to official statistics lately published, the Netherlands had 1,435 miles of railroad in operation at the end of 1885, a gain for the year of 87 miles. Less than one-third of this was double tracked. The whole was under the management of 14 companies, one of which controlled more than half, and five all but a small part of it. By these five 16,645,000 passengers were carried during the year, and 6,519,000 tons of freight. The average passenger mileage was 19½ miles; ton mileage, 19 miles. The rate for passengers was \$0.016 per mile, the same as in 1884, and the gross earnings from passengers, \$5,419,000, or \$110,000 less than in 1884. The rate per ton-mile for freight was \$0.0122, or slightly less than in 1884, and the earnings were \$4,196,000—a slight increase. The gross earnings per mile, from both passengers and freight, were \$6,879—a loss, from 1884, of \$299. Perhaps the most noticeable thing in the statistics is that the passenger traffic was considerably more than half of the whole in value.

DECADENCE IN PERU.

At the close of 1886, 785 miles of railroad were reported in operation in Peru. In 1878 the returns gave 1,560 miles. The difference is largely due to the war with Chili (1879-83), which caused great destruction, and ended with the loss of certain lines by cessions of the territory containing them to Chili.

Two roads, of 23 miles in all, are private; the rest belong to the state. The state, however, manages only one short line, the Lima-Ancon; the rest is let out, on various conditions, to private parties.

The Peruvian roads consist, for the most part, of ten lines from the coast to the interior. The principal one, 313 miles long, extends from Mollendo on the coast to Puno on Lake Titicaca, and thence northwest to Santa Rosa. Some of its grades are 1 in 25, and at Puno it reaches an altitude of about 15,000 ft. The next in length, the Callao-Lima-San Mateo, of 84 miles, has grades as steep as the first, and reaches an altitude almost as great. The extensions of both these lines, the former to Cuzco and the latter to the rich

mining regions of Cerro de Pasco, which had been begun, were interrupted by the war with Chili and have not been resumed.

RAILROADING IN PARAGUAY.

The Republic of Paraguay is not agitated over railroad pools. Its single line is 43 miles long, extending from the capital, Asuncion, southeast to Paraguay. This road, whose gauge is 4 ft. 3½ in. and steepest grade 1 in 75, was begun by the state in 1864. The work was soon interrupted by war, and not resumed till 1870. The state managed the road till 1877, then gave it over to a private company, but bought it again in 1885. All the engines, material and equipment were brought over from England. The equipment, in 1886, consisted of 7 locomotives, 6 passenger and 50 freight cars.

The gross earnings have been: In 1878, \$28,920; in 1881 \$63,000; in 1885, \$93,027. In 1885 net earnings were \$28,080, and 118,943 passengers were carried. The road is valued at \$1,223,910. An extension to Villa Rica is contemplated.

A Suggestion Toward the Solution of the "Fourth Section" Difficulty.

SAVANNAH, Ga., May 30, 1887.

Hon. T. M. Cooley, Chairman Inter-state Commerce Commission.

DEAR SIR: A letter from Senator Reagan to yourself has recently been given to the public, which presents the "raison d'être" of section 4 of the Inter-state Commerce Act so clearly and forcibly, that it seems to me to offer an opportunity to define and limit the issue between those who ask for a suspension of its restrictions, and those who wish them enforced much more closely than has heretofore been done. In the arguments and petitions which have been laid before the Commission, that issue has perhaps been obscured in a discussion of the results involved to a large number of individual interests of more or less magnitude. Such a discussion of results is almost necessarily endless, from the conflicting nature of the individual interests. But if the issue itself, sharply defined, can be intelligently settled upon some equitable principle, without reference to the results involved to particular interests, it will be profitable to return to it.

I refrain, therefore, from comment on any portion of Senator Reagan's letter except the alleged facts which, he states, caused the people to demand, and Congress to enact, that railroads should be forbidden to charge or receive a less sum upon freights carried for a longer than for a shorter distance.

He asserts that it has been, and is, a general custom of railroads to carry distant and competitive freights at figures involving a loss of money, and that they make up for such losses by excessive charges upon short haul and non-competitive freight.

Now, on behalf of the railroad which I represent as a petitioner before the Commission for the exercise of discretion and authority given it in section 4, I most cordially and fully admit that if the above statement of facts is correct, the railroads have been guilty of outrages upon the public and should be restrained. They have no right to take unearned money from A and present it to B. I join heartily with Mr. Reagan in denouncing any such practices. I will even go further, and say that a railroad should be restrained from presenting money to B, even though it had honestly earned it from A and given him its full equivalent in services. In other words, it should not be allowed to serve B at a loss. It should not be allowed to carry long haul freight, or any freight, at less than actual cost.

Freight tariffs adjusted under such a restriction evidently cannot oppress any one, and do not belong to the class at which the law is aimed.

Does not this restriction, then, provide a simple and practical test by which the Commission may separate rates which the law designed to forbid from those which are to be allowed?

It is a fact of such public notoriety that a court may take cognizance of it, that Senator Reagan was the principal promoter of the restrictions placed upon the long haul rates. He officially informs you of the reasons influencing Congress in enacting them. But, in enacting them, Congress created the Commission and gave it discretionary power to suspend these restrictions, thus recognizing the fact that cases might arise where these restrictions would involve harmful results and should be abated. The responsibility is upon the Commission to decide whether such cases have now arisen, and in its cautious discharge you have asked Senator Reagan to indicate what circumstances Congress had in view as sufficient to justify a less charge upon the longer haul. His reply evades a direct answer, but is it not a complete answer in its recital of the evils which the law was designed to abate?

And some answer to this inquiry the Commission is bound to find. Congress has enacted that a certain line must be drawn, not rigidly, but with discretion. Non-action by the tribunal set up to exercise the necessary discretion is really the most extreme action possible.

Now, cannot the line be drawn at those practices which Senator Reagan condemns and which all must condemn, and which you are officially informed, led to the necessity for drawing it? The railroads will not object if you draw it even more narrowly, but we earnestly ask that it be drawn somewhere.

It would meet Senator Reagan's argument, to forbid railroads receiving less upon longer hauls wherever these two things would occur together, to-wit:

1st. Where the railroad would lose money by the long haul service.

2d. Where some shorter haul was charged exorbitant rates.

But it will be, I am sure, certainly satisfactory to the railroad interests to have the Commission go further, as said before, and to draw the line of restriction at even the first case happening alone.

Clearing the discussion, then, of all side issues and reducing it to its simplest form, the following rule may be stated for adjusting all long haul tariffs so as to comply with the intent of Congress.

No rates below cost. Free competition above cost. That very principle is now applied in the classification of freights all over the world. It would be simply applying the same principle to freight going different distances that is now applied to freight possessing different qualities.

There is no trouble in applying the principle to any case which may be brought before you. "Cost" must be understood to mean the actual expense of doing any particular act of transportation as against leaving it undone. For the essence of your inquiry will be whether the particular act, which you are to allow or forbid, will leave the railroad richer or poorer. It must not be the average cost of all work, but the particular cost of the special service in question.

E. P. ALEXANDER, President.

RAILROAD LAW—NOTES OF DECISIONS.

In Mississippi, a freight train lay between the depot and the track on which a passenger train came in. There was an opening between the cars of the freight train through which the passengers who had alighted from the other train were passing, when without any warning an engine was backed against the end of the cars and a passenger caught between the cars and injured. The Supreme Court has just sustained a verdict of \$15,000 against the railroad.¹ In Colorado, while the passengers in an emigrant car, which had been side-tracked over night, were outside in the morning, the train suddenly started, without any signal being given. Plaintiff, who was one of the passengers, jumped onto the platform of the car next to his own, and, after waiting a moment until a brakeman who stood in the passageway moved to one side, he proceeded to cross to his own car. At that moment the cars separated, having been previously uncoupled in order to divide the train, and plaintiff fell between them, and was run over. The brakeman had remained silent all the time. The United States Circuit Court decides that the railroad is liable.²

In Tennessee a mulatto woman purchased a ticket from Woodstock to Memphis, a distance of ten miles. She passed through the front car, and attempted to enter the rear car, which by a regulation of the company, was set apart for "white ladies and gentlemen." She was stopped on the platform, and told to ride in the front car, which she refused to do, and refused to give up her ticket unless allowed to ride in the rear car. She was ejected from the train. It appeared on the trial that persons of both sexes were allowed to ride on the front car without regard to color or race, and the two cars were alike in every respect as to comfort, convenience, safety, and equipment. There was conflicting evidence as to smoking going on at the time in the front car. The Supreme Court holds that she cannot recover damages.³ In the same state a man got on a train and went into the "ladies car," where he was unable to find a seat. He remained in this car standing and refused to surrender his ticket until he was given a seat. The conductor told him that there would soon be seats vacant, or that he could find a seat in the gentlemen's car, but he refused to go into that car, on the ground that the smoking there would make him sick. When his ticket was again demanded of him, he refused to give it up, and was ejected from the train, for which he sued the railroad company for damages. "Ladies" car and "gentlemen's" car in the South seem to answer to the first-class and the smoker in the North. The Supreme Court decides that he has no case, saying: "There can be no doubt that the contract of a carrier of passengers by railway is one not only to furnish the passenger with transportation, but with the comfort of a seat. The contract is no more performed by furnishing him with a seat, without transportation, than it is when he is offered transportation without a seat. It is equally well settled that the passenger need not surrender his ticket until he is furnished with a seat, for the ticket is the evidence of the contract which entitles him to one. But it cannot be that one may ride free because not furnished with a seat. If the passenger chooses to accept transportation without a seat, he must on demand pay his fare. If unwilling to ride without transportation he is furnished him in a seat, he must get off at first opportunity, and by so doing may bring his action for breach of contract, and recover as damages such sum as will compensate him for such breach."⁴

In Wisconsin, a station agent had left an acquaintance, but not an employee of the railroad, in charge of the office for a short time. A dispute arose between the latter and a passenger purchasing a ticket, in which the passenger was struck. It was held that the company was responsible for the assault.⁵

In Oregon, a passenger purchased a limited ticket on the Oregon & California Railway from Portland to Ashland, and, after his ticket had been taken up by the conductor, stopped over at Grant's Pass, without his consent, leaving his baggage, consisting of a large valise, to be carried on to Ashland, where it was taken charge of by the employees of the road. On the next day he got on the train to Ashland, but refused to pay the fare thereto, \$1.79, when the conductor allowed him to remain on the train, but refused to deliver him his valise at Ashland until he paid the additional fare. The Federal Court holds the action of the conductor justifiable, as the carrier has a lien of a passenger's baggage for his fare.⁶

In two cases in Louisiana, the Federal Courts held the Receivers of a railroad liable, in their official capacity, for personal injuries received by passengers.⁷

From Arkansas there comes an interesting decision upon a topic at present much discussed at the bar and on the bench, viz.: the validity of a contract made by an employee releasing the employer from any claim which he may ever have against him for injuries received while in his employment. In England such agreements have been declared legal, and this view has been adopted to some extent by the courts of Georgia. On the other hand, in Ohio, Kansas and Tennessee a different doctrine is held, and Arkansas now follows this lead. In this case a brakeman had signed the following document on entering the service of the company: "Clinton Eubanks, having been employed, at his request, by the Little Rock & Fort Smith Railway in the capacity of brakeman hereby agrees with said railway, in consideration of such employment, that he will take upon himself all risks incident to his position on the road, and will in no case hold the company liable for any injury or damage he may sustain, in his person or otherwise, by accidents or collisions on the trains or road, or which may result from defective machinery, or carelessness or misconduct of himself or any other employee and servant of the company." He was afterwards killed by the train being thrown from the track by a defective switch, and his executor sued the company. The latter set up the release just mentioned. But the Supreme Court holds this no defense, saying: "Our constitution and laws provide that all railroads operated in this state shall be responsible for all damages to persons and property done by the running of trains. This means that they shall be responsible only in cases where they have been guilty of some negligence; and it may be questionable whether it is in their power to denude themselves of such responsibility by a stipulation in advance. But we prefer to rest our decision upon the broader ground of considerations of public policy. The law requires the master to furnish his servant with a reasonably safe place to work in, and with sound and suitable tools and appliances to do his work. If he can supply an unsafe machine or defective instruments, and then excuse himself against the consequences of his own negligence by the terms of his contract with his servant, he is enabled to evade a most salutary rule. In the English cases it is said this is not against public policy, because it does not affect all society, but only the interest of the employed. But surely the state has an interest in the lives and limbs of all its citizens. Laborers for hire constitute a numerous and meritorious class in every community; and it is for the welfare of society that their employers shall not be permitted, under the guise of enforcing contract rights, to abdicate their duties to them. The consequence would be that every railroad company, and every owner of a factory, mill, or mine, would make it a condition precedent to the employment of labor that the

laborer should release all right of action for injuries sustained in the course of the service, whether by the employer's negligence or otherwise. The natural tendency of this would be to relax the employer's carefulness in those matters of which he has the ordering and control, such as the supplying of machinery and materials, and thus increase the perils of occupations which are hazardous even when well managed; and the final outcome would be to fill the country with disabled men and paupers, whose support would become a charge upon the counties or upon public charity."⁸

In Iowa, it is ruled that it is not contributory negligence for a brakeman to ride on the locomotive.⁹ In Massachusetts a brakeman jumped upon a moving train and was struck by a pile of lumber near the track. The brakeman "knew the pile was there, but did not think it was so close." The Supreme Court rules that he was guilty of contributory negligence and cannot recover damages.¹⁰ In Tennessee it is held in an action by a brakeman that the acceptance by a road of a flat car loaded with lumber projecting eighteen inches from the end of the car is not negligence.¹¹ In Wisconsin it is held that a "section boss" and a brakeman are not "fellow-servants."¹²

- ¹ Louisville, N. O. & T. R. Co. v. Thompson, 1 South. Rep., 840.
- ² Andust v. Union Pac. R. Co., 30 Feb. Rep., 345.
- ³ Chesapeake & R. Co. v. Wells, 4 S. W. Rep., 5.
- ⁴ Memphis & C. R. Co. v. Benson, 4 S. W. Rep., 6.
- ⁵ Fick v. C. & N. W. R. Co., 32 N. W. Rep., 527.
- ⁶ Roberts v. Koehler, 30 Fed. Rep., 94.
- ⁷ Winborn's case and Pope's case v. Texas & Pac. R. Co., 30 Fed. Rep., 167.
- ⁸ Little Rock & Ft. S. R. Co. v. Eubanks, 3 S. W. Rep., 810.
- ⁹ Connors v. Burlington, C. R. & N. R. Co., 32 N. W. Rep., 405.
- ¹⁰ Gaffney v. N. Y. & N. E. R. Co., 4 New Eng. Rep., 33.
- ¹¹ Louisville & N. R. Co. v. Gower, 3 S. W. Rep., 824.
- ¹² Hullehan v. Green Bay, N. W. & St. P. R. Co., 32 W. Rep., 529.

TECHNICAL.

The Car Shops.

The Michigan Car Co. has a contract to build 900 cars for the Ohio & Mississippi.

The Lehigh Car Manufacturing Co., at Stenton, Pa., has received an order for 100 box and 30 gondola cars.

Bridge Notes.

The city of St. Paul, Minn., has just given the contract for a bridge to the Keystone Bridge Co., for \$340,324. Articles of incorporation of the Burlington & Illinois Bridge Co. were filed in Burlington, Ia., this week. The capital stock of the company is \$300,000, and its object the building of a wagon and railroad bridge across the Mississippi River between Burlington and Henderson County, Ill. The stock has all been subscribed by Burlington business men.

Bids are invited for an iron bridge over Buck Creek, Springfield, O. Address J. S. Shewalter, City Clerk, until July 27.

Bids for masonry and for iron superstructure are invited on bridge at Symmes Township, O. Address Commissioners of Hamilton County at the Auditor's office in Cincinnati until July 30.

Manufacturing and Business.

The Chalmers-Spence Co., of New York, have taken a contract from a leading steam heating firm of Boston for 25,000 ft., or nearly 5 miles, of all asbestos pipe covering.

The Providence, R. I., Steam Engine Co. are making two shipments of the improved Greene engine to Germany.

The Chicago Car Wheel Co. have resumed operations in a new location. They manufacture only car wheels, and have a capacity of 200 to 250 wheels per day.

The Penfield Block Co., of Lockport, N. Y., is putting in new and improved machinery for the manufacture of a wooden snow shovel especially adapted for railroad use. The company reports an increasing demand for its improved bolting blocks for wire and manilla rope. These blocks are made with phosphor bronze self-lubricating bushings.

E. S. Greeley & Co., of New York, manufacturers of railway and telegraph machinery and supplies, announce that for the purpose of admitting several old and valued employees into a full interest and representation into their business, they have formed a company under the corporate name of "The E. S. Greeley & Co." Mr. E. S. Greeley retains a controlling interest, and will continue in the general management of the entire business. Mr. Arthur Parker, for several years an associate in the firm, retains his former interest and the special direction of the Southern Sales Department. The following newly admitted members will continue to exercise the management of their respective departments as heretofore: Mr. M. W. Goodyear, in charge of the Electrical Department; Mr. Joseph Bailey, Western Sales Department; Mr. E. S. Riggs, home office of the Railroad Department; Mr. J. W. Sands, in charge of the Book-keeping and Cashier's Department.

The Wainwright Manufacturing Co., of Boston, have appointed Sen. Victoriano de la Calle, of Matanzas, their agent in Cuba for the sale of their specialties, such as corrugated tubing, feed-water heaters, radiators, etc.

The Webster, Camp & Lane Machine Co., of Akron, O., manufacturers of steam engines and hoisting machinery, have found it necessary to enlarge their works. The work is already well advanced on a brick erecting shop 50 ft. wide by 116 ft. long, with an L 40 ft. wide connecting this with their present machine shop. Adjoining this is a 40 x 70 ft. brick smith shop. The erecting shop is to have a 20-ton traveling crane traversing the whole length of the building.

The National Electric Headlight Company has been incorporated by O. Kinsey, I. Kinsey and E. V. Cherry, at Ludlow, Ky., with a capital stock of \$650,000.

The National Iron Works, of New Brunswick, N. J., has just shipped to Galveston, Texas, the iron work for a large Marine Railway for the Galveston Wharf Co. On account of the ravages of the teredo, it became necessary to build the entire ground ways and track, which were to be under the water, of iron, so that they would not be destroyed by this industrious eater of wood. The pilings also have to be enclosed in zinc casings.

The New York Belting & Packing Co., manufacturers of rubber belting, packing, hose and general rubber goods for mechanical purposes, has established a European branch depot at Hamburg. Messrs. Perscauer & Co. have been appointed general agents, and will carry a full stock of the firm's goods. Hamburg is a free port of entry, and will be used as a distributing point for other continental markets.

The Holly Manufacturing Co., of Lockport, N. Y., has received a contract for a new 20,000-gallon pumping engine for the water-works in Buffalo, N. Y. The price agreed upon is \$98,750, which includes six boilers and the setting of them complete.

Iron and Steel.

There are but four furnaces in blast in the Shenango Valley, Pa.—one of the Etna, at New Castle; one of the Sharon and two of the Stewart, at Sharon. The rest are either idle or banked on account of the coke strike.

The rod mill of the Cambria Iron Company, Johnstown, was to resume Thursday last, after a shut down since June 10. Natural gas will be used in the furnaces.

With a crew of 150 men employed the Rolling Mills Co.,

at Portland, Me., are turning out large quantities of merchant bar iron. They are making six different patterns of fish plates, both angle and flat, together with railroad spikes, and are also fitting up for the making of horseshoes, which will be a new departure.

The Illinois Iron & Bolt Co., of Carpentersville, Ill., are putting up a new building, 52 x 128 ft. in size and one story high, for a forge shop, and are getting new machinery for it.

The Rail Market.

Steel Rails.—Sales by Eastern works aggregate 25,000 tons during the past week, including one lot of 10,000 tons for a road in Illinois for October delivery. For early delivery \$38.50@39.75 is paid; for later work, \$38@38.50, and for late fall and winter work, \$38. It is estimated that the sales to date are not less than 1,500,000 gross tons, against 1,614,545 reported June 1. A meeting of the steel rail manufacturers will be held at Long Branch, N. J., early in August.

Old Rails.—A sale is reported of 2,000 tons American tees, at a point on the Hudson River, private terms. Quotations, \$23@23.50 for tees, and \$24@25 for doubles.

Scrap.—Market is dull, with yard scrap \$20.50@21.50.

Railroad Fastenings.—Spikes are quoted 2.40@2.50c net; angle fish-bars, 2.10@2.25c; steel angle bars, \$2.20@2.30; bolts and nuts, 3@3.20c; bolts and hexagon nuts, 3.20@3.30c.

Compelled to Make an Assignment.

Gardner & Co., of New York, manufacturers of perforated veneer seatings for car seats, have issued the following card:

"We regret to state that we have been compelled to make a general assignment for the benefit of our creditors. We are now taking stock, and hope to have our statement ready within a few days, and desire all our creditors to examine same, and would be pleased if you would meet with them on Thursday, July 14th, at 12 o'clock, at the office, 47 West Forty-second street. Very respectfully yours, GARDNER & Co."

A Railroad for Persia.

The first line of railway for Persia will be under construction soon, according to reports. A large syndicate, says *The Ironmonger*, composed chiefly of Belgians, has obtained from the Persian Government, after protracted negotiations—more than a year—the concession for constructing this railway. The first line will run from the capital, Teheran, to the celebrated place of pilgrimage, Shah-Abdul-Azim, a town of 90,000 inhabitants, and it will be about 10 kilometres in length. The concession granted to this Belgian company has, however, an importance for them far exceeding any value that can be attached to any single line of rail, for it entitles them to the exclusive right of constructing and working a long line from the Caspian Sea to the Persian Gulf. The name of the company will be "Société Anonyme Belge des Chemins de fer Persans," and is now established in Brussels.

Testing Steam, Water and Coal Measurements.

The Lehigh Valley Railroad Co. has begun with a special engine just built, to make some important tests under the inspection of Prof. Kline, of Lehigh University. These tests will include measurements of steam, water and coal per mile, and are undertaken with a view to learning the most effective service in locomotives with the most economical methods.

Consolidation of Iron Companies.

The directors of the Alabama & Tennessee Coal & Iron Co., the Sheffield Land, Iron & Coal Co., the Sheffield Furnace Co., Lady Emsly Furnace Co. and the Alabama Improvement Co. have agreed to recommend to the stockholders of the companies that the said companies be consolidated, and a meeting has been called for July 22, at Sheffield, Ala., to vote on the proposition.

Trades Unionism on English Railroads.

The Amalgamated Society of Railway Servants (England) is a trades union, but is chiefly designed as a benefit society for the widows and orphans of members. The society consists chiefly of locomotive runners and firemen, conductors, brakemen, signalmen, yardmen, etc. The membership is 9,609, and the total balance on hand was at the rate of \$28.25 per member. The funds are partly invested in English railroad bonds, but chiefly in the Post Office Savings Banks and in mortgages on real estate. The total receipts for the year 1886 were nearly \$62,000, and the expenses \$42,000 showing a considerable increase of the surplus. About \$7,500 was spent in donations to widows and to members when superannuated, and a similar sum was given to orphans. Members out of employment received nearly \$3,000, and a somewhat larger amount was spent on legal expenses, chiefly in contesting cases arising between railroads and their employees. Some \$2,500 appears as the cost of a car coupler trial, the men themselves taking the initiative in seeking for safer appliances; \$1,750 was spent in giving prizes to the competitors, a species of generosity which may well astonish our own corporations. The cost of management of the society was about \$13,000, which though probably as low as possible, forms a large proportion of the total receipts, and shows the expense of collecting a large number of small weekly or monthly assessments on the members.

The society has many honorary members, including 15 members of Parliament, many heavy freighters, a well-known locomotive builder, some shipbuilders and other manufacturers. The society has about 180 branches situated at important railroad points, and each including from 15 to 150 members. The general management appears to chiefly devolve upon an executive committee of thirteen members, the duties of the President and Vice-Presidents (of whom two are peers and three members or ex-members of the House of Commons) being chiefly ornamental. The General Secretary, Mr. Edward Harford, is the principal executive officer, and receives the moderate salary of \$1,150 per annum. The delegates and members evidently do not invariably travel on passes as several heavy sums are charged as "ares." The society owns a paper, *The Railway Review*, which appears hardly to pay its way.

The annual report from which the above particulars are gleaned is a well arranged little pamphlet giving the financial standing of each branch, with the names of the men, widows and orphans benefitted.

It may be added that several purely benefit societies exist among English railroad men, and that most of the large railroads have organized accident and superannuation funds, the company contributing one-half and the men the other.

The fitters, machinists and erectors belong largely to the Amalgamated Engineers, the most conservative and successful of trades unions, while the smiths, boiler makers, joiners, etc., have each their own trades union not specially limited to railroad men, but embracing that particular class of mechanic.

Petroleum on Locomotives.

A method of using crude petroleum on locomotives, the invention of Mr. B. A. Moody, of Dedham, has been tried at the Hinkley Locomotive Works in Boston, as applied to a condemned Boston & Providence engine. The crude petroleum is carried in a tank in the tender, and thence is conducted through a pipe into the fire-box. At the end of this pipe is a peculiar burner, the invention of Mr. Moody. Through a semi-circular slot, 1-16th of an inch across, the

fuel flows out on to a flat table, of somewhat the shape of, but a little smaller than, an ordinary palm leaf fan. At the apex of this table, and just above the entering point of the petroleum, is the outlet of another pipe, which leads from the boiler of the locomotive. The steam, which is taken from the boiler at a pressure of about 150 lbs., is passed through a Mason valve, reducing the pressure to 40 lbs. At this pressure it sweeps across the flat table on which the petroleum is flowing, and forms a fine spray, which is forced through the interstices of a large pile of fire brick, piled in the fire-box. When this spray is lighted, the heat after a few moments becomes intense, and in the opinion of the engineers present at the test a far higher temperature is obtained than can be by the combustion of coal in a locomotive fire-box. In order to get a steam pressure with which to start the flame, it is necessary to use a small auxiliary boiler, about the size of those used on small steam launches, but when the steam is once generated in the main boiler the pressure is taken direct. The apparatus for governing the supply of fuel is placed on the fireman's side of the cab, and, in the future, that individual will be relieved of the task of shoveling coal, and his chief duty will be to regulate the supply of petroleum by means of a couple of handles, which move along a slotted segment. In regard to the comparative cost of this method, it is claimed that the average consumption of petroleum for an engine drawing an ordinary train of passenger cars was found to be about 2 gallons per mile.

New Oscillating Engines for a Sound Steamer.

The contract for building the engines and boilers of the new side-wheel passenger steamer for the Providence & Stonington Steamship Co. has been awarded to the Cramps, of Philadelphia. The engines will be double-expansion compound, inclined, direct acting, surface-condensing "oscillators," with one crank-pin. The cylinders will be set at an angle of 100° with each other. The high and low-pressure cylinders will be 56 and 104 in. dia., respectively, both to have 11 ft. stroke. The high-pressure cylinder will stand forward and the low pressure aft. Both cylinders will have the Wheelocks automatic gridiron cut-off valve gear. The trip gear will be arranged so as to be changed while the engines are working. The valves will be worked by the Stephenson link motion, by means of eccentrics on the main shaft. The reversing gear, starting gear, throttle, etc., will be all worked from a convenient platform.

The main air and feed pumps will be worked by a separate compound engine. The paddle wheels will be of the feathering type, 29 ft. diameter, with 12 buckets, 14 ft. face and 4 ft. 6 in. wide. Steam will be supplied by 6 boilers 12 ft. 6 in. dia. and 20 ft. 3 in. long. The boilers will carry 120 lbs. steam pressure. Each boiler will have 3 corrugated furnaces 48 in. dia. and 7½ ft. long. The engine is expected to develop about 4,500 I. H. P., at 25 revolutions per minute, and was designed by Mr. George B. Mallory.

Burning Petroleum in Russia.

Some experiments have been lately made in Russia with a system of burning petroleum, invented by a Russian mechanical engineer, Mr. Pashinin. It is stated that the results of a trial, conducted on behalf of the Russian government, showed an evaporation of 15.6 pounds of water per pound of petroleum. The gravity of the latter was .91 and the cost 1.3 cents per pound at St. Petersburg. The amount of smoke was inappreciable. The petroleum was burned with jets of hot air and steam. Other experiments on a locomotive showed a consumption of 1,094 lbs. of petroleum per indicated horse-power per hour.

The Tay Bridge.

The Tay Bridge is completed and has been tested by the Board of Trade Inspector, with a load of ten locomotives weighing in all 1,635,000 lbs. Five locomotives were placed on each track. The bridge will shortly be opened for passenger traffic, and it is expected that the Forth Bridge will be finished in 1890, completing the direct route from Edinburgh to Dundee and Aberdeen.

Clyde Ship-building.

The launches on the Clyde for the first six months in 1887 amounted to 86,565 tons, against 84,623 in the first six months in 1886, which was the slackest year in this business since 1877, when the tonnage launched amounted to 80,578. In 1883, the year of phenomenal building, the tonnage launched from Clyde yards up to the end of June amounted to 198,729, since which time the amount decreased till and including 1886.

The London Iron Trade Exchange says of the trade that no new orders are coming in, and except an expected order for two new cruisers of about 3,000 tons, which are expected to be constructed on the Clyde, and will give employment to a large number of hands, the outlook for both employer and employed is not very encouraging.

The Rote Brake.

The Rote Brake Co. announces that a 50-car train, equipped with its brake, will very soon make a run from Chicago to Jersey City by the Chicago & Atlantic, New York, Pennsylvania & Ohio and Erie line.

Working Metals by Electricity.

The *Electrical World* of July 9 gives an account with some illustrations of the method of M. de Benardoz for welding two metals by electricity. A cast-iron plate is mounted on an insulated table and is permanently connected with the negative pole of the source of current. The pieces to be welded are placed upon this "anvil" and thus automatically put in contact with the negative pole. The positive pole of the source of current is connected with an electric light carbon by a flexible conductor. The carbon is held in an insulating handle by a workman. Applying the carbon point to the part to be welded closes the electric circuit, then raising the carbon a short distance starts the voltaic arc, which causes the fusion of the metals. This process can be employed, not only in welding metals but for piercing, drilling and cutting. The most important application of this process thus far is in the manufacture of metal tanks and casks. It is obvious that the flexibility of the apparatus will make it applicable to an immense variety of purposes, if it becomes commercially practicable.

Electric Train Lighting.

At the last meeting of the American Institute of Electrical Engineers, in New York, Mr. E. E. Rice gave some account of experiments he had made with apparatus for running a dynamo (for train lighting) by the power derived from the axle of a car. He said: "I have given some attention to the matter of accumulating the surplus energy of a train and storing it in the form of electric energy. * * * I have devised a form of pendulum switch (any other form of gravity switch will answer) whereby the amount of current produced by a generator for charging the battery is directly proportional to the inclination of the grade: as long as the train is running on a level, the field magnet coils of the generator are open, and the magnetic strength can be increased or diminished at will. The number of coils thrown in the circuit is automatically adjusted by means of this switch, before mentioned, whereby, when the train is running down on a steeper incline than before, it makes a stronger magnetic field, absorbs a

greater proportion of the energy of the train, and generates a correspondingly increased volume of current, which is stored in a battery for use as required. By means of a system of this kind, the battery, when once in position, is self-charging, so to speak. The generator is so arranged that as the speed of the train slackens, in case of wanting to come to a stop, the field magnet strength is automatically increased. We have both a gravity switch and a governor in this arrangement, so that the requisite electromotive force is produced until the speed of the train has very nearly ceased."

It is of course apparent that on many lines the down grade portions of any given trip are so short or so irregular that the complications introduced by this automatic arrangement would more than balance the saving in power. If a dynamo can be successfully worked from a car axle, the additional expense of revolving the axle will, it is so small, be overlooked, probably.

Engineers' Club of Kansas City.

At the regular meeting of July 5, 1887, it was decided that instead of the regular meeting of Aug. 1, the club should, on invitation of Mr. O. Chanute, visit the work at the crossing of the Chicago, Santa Fe & California over the Missouri at Sibley.

Mr. Pearson's paper on Standard Time was not presented. Mr. Waddell gave some account of experiments on cast-iron cable yokes recently made by himself and Prof. Johnson at the testing laboratory of the Washington University, St. Louis. The Secretary read extracts from the address of the retiring president of the Engineers' Club of Philadelphia. He also presented for Mr. Pearson photographs showing the progress of construction on the new Kansas City water-works. Extracts were read from the papers of the American Society of Civil Engineers on Standard Time.

Production of Pig Iron for the First Half of 1887.

The *American Manufacturer* estimates the production of pig iron in this country for the first six months of 1887 in tons of 2,240 pounds, as

Charcoal	255,760
Anthracite	1,099,372
Bituminous	1,802,078
Total	3,157,210

The production for the first half of 1886 was 2,637,687 gross tons, an increase of 519,523 tons, or 19 per cent. The production would have been larger if it had not been for the coke strikes.

THE SCRAP HEAP.

The Chairman of the London & Northwestern.

The Queen has made Mr. Richard Moon, the Chairman of the London & Northwestern Railway Co., a baronet. Sir Sir Richard Moon has been connected with the direction of the London & Northwestern since 1850, and has been Chairman since 1860, when he succeeded Admiral Moorsome on his death. Since his chairmanship the mileage, etc., of the road has increased as follows:

	1860.	1886.	Increase.
Mileage	920	1,834	914
Capital	£27,180,000	£108,427,000	£81,247,000
Receipts, passengers	2,077,000	4,125,000	2,048,000
" goods	2,145,000	5,888,000	3,743,000
" total	2,312,000	10,013,000	7,701,000
Number of passengers	12,743,000	55,271,000	42,528,000
Passenger mileage	7,200,000	19,538,000	12,338,000
Tonnage of goods, etc.	8,091,000	32,834,000	24,743,000
Goods mileage	7,216,000	18,087,000	10,871,000
Dividends	5½%	6½%	1%

While Sir Richard is the only railroad manager who has been honored in this way, her Majesty has emphasized the dependence the British place on the ship-building industry by knighting three Clyde ship-builders.

Toothpicks.

A toothpick manufacturing association in the Eastern States, who have their centre in Maine, have contracts for the coming year sufficient to load a train of 50 cars with nothing but toothpicks, and meanwhile will take out of the state of Maine five thousand millions of these little implements. One mill is at Belmont, N. Y., and others are in Michigan and Wisconsin.

An Early Christmas Gift.

Messrs. McElroy, Guggell and others will build a \$7,000 depot at Independence, Kan., which will be presented by them to the Chicago & Alton and the Missouri Pacific.

Opposing Intemperance on the Reading.

A newspaper item says: "The order of Superintendent Lawler, of the Schuylkill Division of the Philadelphia & Reading, prohibiting any of the employees to drink liquor, whether on or off duty, is supplemented by an order that any man reported as having been seen taking a drink of liquor or beer, will be summarily discharged."

Keeping Step with the Old Romancers.

"Young man," kindly said the city editor of a Dakota daily to the new reporter, "in this article of yours about the new railroad I notice you omit to say that 'the dirt will begin to fly soon,' so I slipped it in in three or four places. It must always go in and it is to your own interest to remember it. If that article was printed without it the editor would roar so in the morning that the doors of the safe would tremble, and you would lose your place. The dirt has flown, on paper, for ten years before it was built on every road in Dakota ever since the territory was organized, and it is no time now to rush in and attempt to change old-established customs."—*Dakota Bell*.

The Old Huckleberry Train Again.

A man was in the smoking car on a Dakota train and put his head out of a window to look at some stock. In drawing back, his fine silk hat came off and fell down by the side of the car.

"See here, conductor," he yelled, "I lost a five-dollar hat out this window—what are you going to do about it?" "Just step back to the hind platform of the sleeper and pick it up as you go past," replied the conductor. "We're behind time and trying to make it up, so I can't stop for it."—*Dakota Bell*.

Patent Applied For.

"Here's a mighty neat thing in our line," said Sellmout, the newsgent. "I invented it myself; and if the company takes hold of it, as I think it will, I'm going to make a roll out of it." "Explain the game," said Ixion, the brakeman. "It is a banana case," replied Sellmout. "You see, after a banana has been carried up and down the road six or seven weeks, it begins to look bruised and black, especially if it has been handled a great deal." The man at the wheel had noticed this peculiarity of the vegetable sausage. "Well, this is a banana case of leather. It is light, but very tough and pliable, colored to the shade of the average banana, red or yellow, as the case may be. I peel the

old banana slip it into this bright case, which looks as though it had just been taken from the tree, and the passenger buys it unhesitatingly. When he throws the case on the floor—and no railroad passenger was ever known to throw a banana peel anywhere else—I come along in a spasm of neatness, and remove it before he can get on to the pastime. It's a big thing, and if you'd like to come in, I can let you in on the ground floor." "I believe I will," said Ixion; "it will be clear profit every time, because you're the inventor and can make all the cases out of your own head. Bleachery! All out for Bleachery."—*Burdette*.

Mr. Gould is Annoyed.

NEW YORK, July 12.—Jay Gould manifested a good deal of annoyance to-day when he was asked about the present status of the Baltimore & Ohio deal. "I am sick and tired of contradicting the nonsensical rumors afloat," said he, "and I do not care to talk about the matter. Negotiations are now pending, and the whole truth will come out in a few days. You may, however, deny the report that the Baltimore & Ohio Telegraph line has been offered to me for \$4,000,000. I have never been offered that telegraph line for the amount named. The whole thing is nonsense." Henry S. Ives unreservedly endorsed what Mr. Gould said, and Mr. Alfred Sully said that the negotiations concerning the control of the Baltimore & Ohio Railroad and telegraph line were progressing satisfactorily, and the result would be announced in a few days.—*Baltimore Sun*.

Queer Charter for an Iron Company.

A bill to amend the charter of the Franconia Iron Company is now lying upon the table in the New Hampshire Legislature, it having been reported from the committee to which it was referred. As will be seen, it involves interests of enormous magnitude, and before it passes its projector will probably be required to favor the legislators with some pretty full explanations as to its intent. The fact that it provides for an investment of \$3,000,000 for the purchase and construction of facilities for the transportation of its products and supplies by water, is somewhat singular, as the mine is in the town of Franconia, in the White Mountains, and the nearest seaport, Portsmouth, is 200 or more miles away. Grades and head winds might make the progress of iron steamships between Boston and the White Mountains somewhat difficult, but the bill is likely to have about as hard a passage, unless it is divested of the suspicious features which now enshroud it. Under this bill railroads can be rebuilt or purchased, and the measure is one of the most important yet presented. The provisions of the bill are as follows: The company may increase its capital stock to not exceeding \$10,000,000. It may hold real estate not exceeding \$5,000,000 in value. It may invest an amount not exceeding \$3,000,000 in the construction or purchase and maintenance of facilities for transportation of its product and supplies by water.—*Boston Herald*.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:
Duluth, South Shore & Atlantic.—Annual meeting, at the office, Marquette, Mich., July 21.
Marquette, Houghton & Ontonagon, annual meeting, at the office, Marquette, Mich., July 21.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:
The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.
The *American Institute of Mining Engineers*, forty-ninth meeting, Duluth, Minn., July 25.
The *National Association of General Passenger Agents*, at St. Paul, Minn., Sept. 20.
The *National Association of General Baggage Agents*, Denver, Col., July 20.
The *Master Car and Locomotive Painters' Association*, New York, Sept. 14.

Meeting of Railway Telegraphers.

The opening session of the sixth annual meeting of the Association of Railway Telegraph Superintendents was held in Boston on July 13, with about 40 members present. A. H. Swift, of the Chicago, Rock Island & Pacific, presided. The principal subject discussed was how to do away with the many superfluous messages that now encumber the wires.

American Society of Civil Engineers.

At the regular meeting, July 13, the following were elected members: John Ferris Alden, Frank Milligan Ashmead, William Henry Brethaupt, Henry Thompson Douglas, Ulysses Stanislaus Lutz, James Moore Shanly.

PERSONAL.

—W. S. Weed has resigned the position of General Freight Agent of the Lake Erie & Western.

—J. B. Foley has resigned the position of General Agent of the Columbus, Hocking Valley & Toledo.

—E. D. Standiford, Ex-President of the Louisville & Nashville Railroad, was married at Paducah, Ky., last week, to Miss Lorena Scott.

—Prof. Geo. F. Swain, of the Massachusetts Institute of Technology, has been appointed Engineer to the state Board of Railroad Commissioners of Massachusetts.

—John W. Mersereau died at his home on Staten Island, N. Y., on July 11. For many years he was Vice-President and Treasurer of the Staten Island Railroad Co. and was one of its directors at the time of his death.

—W. C. Quincy has resigned the position as General Manager of the Pittsburgh & Lake Erie, and will now be connected with the iron firm of Jones & Laughlin, of Pittsburgh. Mr. Quincy has held the position of General Manager since the road first started in 1879. For 30 years previous to that he was with the Baltimore & Ohio.

—Charles M. Hays, who has succeeded the late A. A. Talmage as General Manager of the Wabash Western, is a very young man for the position, his age being 33 years. He started in the railroad business with the Missouri Pacific. He passed through nearly every department of this road. In 1874 he went into the office of Mr. Talmage, who was then General Superintendent of the Atlantic & Pacific and Missouri Pacific, and from that time has been constantly with him.

—James F. How, who has been appointed Vice-President of the Wabash Western, was employed as clerk in the passenger department of the North Missouri road in 1883. He was afterwards elected Secretary of the company, and he

held this position in the St. Louis, Kansas City & Northern, the successor of the Northern Missouri. In 1876 he was elected Vice-President of the St. Louis, Kansas City & Northern, holding the position until that company was consolidated with the Wabash, forming the Wabash, St. Louis & Pacific, of which company he was elected Secretary and subsequently Vice-President. In 1883, when the Wabash, St. Louis & Pacific was leased to the St. Louis, Iron Mountain & Southern, Mr. How was retained as Secretary, and elected Assistant Secretary of the Missouri Pacific. When the Wabash, St. Louis & Pacific went into the hands of Receivers, Mr. How was made General Agent, which position he holds now, in addition to those of Secretary and Treasurer of the Wabash Western.

—Jackson Bailey, editor and one of the founders of the *American Machinist*, died at his home in Brooklyn, N. Y., Thursday, July 7, in the forty-first year of his age, of consumption of the bowels. Mr. Bailey enlisted as a private in the One Hundred and Thirty-fourth Regiment of New York Infantry at the age of fifteen, and served three years to the close of the war. He was at Missionary Ridge and in several other battles, and served in Sherman's army during the march to the sea. Mustered out of service at eighteen years of age, he entered the State Normal School at Albany, N. Y., from which he graduated in due course and afterwards was engaged in teaching. Later on he connected himself with a New York publishing firm, which position he relinquished to become New York representative of the *American Manufacturer and Iron World*, of Pittsburgh. In November, 1877, the *American Machinist* was established, Mr. Bailey retaining his connection with it up to the time of his death. At the time of his death Mr. Bailey was First Vice-President of the New Press Club, a Mason, and a member of a number of engineering societies.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—J. T. Harmer has been appointed Assistant General Auditor, with headquarters at Boston.

Capay Valley.—The directors of the new road to be built in California are C. F. Crocker, W. V. Huntington, N. S. Smith, T. Hopkins, F. S. Dooty and E. H. Miller.

Carbon, Schuylkill & Western.—The directors of this new Pennsylvania company are Edwin L. Cononghey, Thomas F. Baltz, W. F. Hizon, William A. Baker, H. C. Lincoln, and E. J. Price, of Philadelphia. John J. Summers, of Philadelphia, is President.

Chateaugay.—The managers of the new road which will extend the Chateaugay road into the Adirondack Mountains, are Smith M. Weed, who, as individual, takes 400 shares, and as trustee 1,200 shares; Andrew Williams, Alvin L. Inman, Willard F. Parkhurst, Milton L. French, William E. Smith, Peter S. Palmer, Roswell A. Wred, Henry Paris, of Plattsburg; Robert M. Olyphant, Le Grand B. Cannon, of New York; James A. Buren, of Troy, and Edward Hall, of Lyon Mountain, N. Y.

Chicago & Atlantic.—B. A. Branch has been appointed Western Traveling Passenger Agent office at Chicago, with charge of passenger traffic in Illinois, Iowa, Wisconsin, Nebraska and the upper peninsula of Michigan.

Chicago, Jefferson City, Girard & El Paso.—The directors of this new Kansas company are: Hugh McMillan and W. B. Gow, of Chicago; J. B. Price, S. W. Cox, W. W. Wagner and J. C. Fisher, of Jefferson City; S. E. Barber, of Mulberry Grove, Kan.; W. F. Higgle, F. E. Fanger, G. E. Howard and J. D. Bradley, of Girard, Kan.; C. M. Cannon, of Oswego, Kan.

Chicago, Rock Island & Pacific.—Frank Horton has been appointed Chief Train Dispatcher of the East Iowa Division, with office at Davenport; vice W. J. Ryan.

Clearfield & Allegheny.—The directors of this new Pennsylvania company are Edwin L. McCononghey, Thomas F. Baltz, W. F. Hizon, William A. Baker, H. C. Lincoln and E. G. Price, of Philadelphia. John J. Summers, of Philadelphia, is President.

Clearfield & Dubois.—John E. Dubois is president of this new Pennsylvania company.

Cleveland, Columbus, Cincinnati & Indianapolis.—Edward Hill has been appointed Purchasing Agent, vice J. L. Yale, resigned, with office at Cleveland, O.

Columbus, Hocking Valley & Toledo.—C. L. Sprague has been appointed Traveling Freight Agent for this company in Michigan and Canada, with headquarters in Detroit, Mich.

Dayton & Michigan.—The directors have elected the following officers: Thomas J. Emery, President; J. J. Emery, Vice-President; F. H. Short, Secretary and Treasurer.

Delaware, Lackawanna & Western.—Nicholas Muller, Jr., has been appointed General Eastern Passenger Agent.

Denver, Russell Springs & Southwestern.—The directors of this new Kansas company are: D. M. Richardson, of Denver, Col.; James Parden, Frankfort, Kan.; J. E. Hilty, Russell Springs, Kan.; James C. Frazier, Fort Scott, Kan.; and H. Smith, H. L. Whitford, T. C. Sawyer, B. L. Allison and C. A. Walter, of McPherson, Kan.

Desha & Eureka.—The directors of this new Arkansas company are: G. P. Banks, H. M. Cross, of Boston; E. E. Pratt, Manchester, Mass.; W. E. Stowe, Belmont, Mass.; J. Murphy, W. B. Dutton, W. H. Waldon, J. M. Whitehill and James M. Barnard, of Desha County, Ark.

Fort Scott, Wichita & Western.—The directors of this company, which is the St. Louis, Fort Scott & Wichita under a new name, are Jay Gould, George J. Gould, Amos L. Hopkins and Russell Sage, of New York; R. Harding, H. C. Hadley and J. H. Richards, of Wichita, Kan.

Hartford & Connecticut Western.—James W. Husted is said to have been elected President of this company.

Lake Shore & Michigan Southern.—O. D. Richards has been appointed Engineer of Michigan Southern Division, office at Toledo, O., vice Benjamin Reece, resigned, and G. C. Dunham has been appointed Engineer of Lake Shore Division, office at Cleveland, O., vice O. D. Richards, transferred.

Lockport & Buffalo.—The following directors have been elected: Thomas T. Flagler, James Jackson, Jr., Alonzo J. Mausfield, William Richmond, William Spalding, James S. Liddle, Ambrose S. Beverly, Levi F. Borne, J. Carl Jackson, John Hodge, John T. Darrison, William McRae and Washington H. Ransom.

Mexican National.—Col. D. C. Dodge has been elected Second Vice-President and General Manager, office at the City of Mexico. William Spackman has been elected Treasurer and Andrew Anderson, Jr., Secretary, office in New York. George D. Wadley is appointed Superintendent of Construction, with office in Mexico.

New York, Chicago & St. Louis Railroad.—The different corporations which have been organized since the foreclosure of this road were consolidated this week under the above name, and the following directors were elected: W. K. Vanderbilt, Cornelius Vanderbilt, Frederick Vanderbilt, H. McK. Twombly, H. B. Hollin, F. P. Olcott, John S. Kennedy, James A. Roosevelt, of New York; Charles M. Reed, Frank A. Mizener, Joseph McCarter and S. A. Davenport, of Erie. For president of the new road James A. Roosevelt was elected, with Allen Cox as Secretary and Treasurer.

Northern Pacific.—William Endicott, Jr., of Boston, will succeed John C. Bullitt, who has resigned from the directorship.

Ohio Valley.—W. B. Halstead has been appointed General Freight and Passenger Agent, headquarters at Henderson, Ky.

Omaha, Dighton & Southwestern.—The directors of this new Kansas company are: H. L. Hill, Charles W. Keith, W. M. Woods, J. C. Wilkinson and C. B. Frazier.

Oregon Railway & Navigation Co.—The following changes have been announced: Robert Fyfe, appointed Auditor, vice J. H. Huddleson, resigned; A. L. Maxwell, appointed General Passenger and Ticket Agent, vice J. J. Byrne, resigned; and W. H. Kennedy, appointed Chief Engineer.

Robert Fyfe has been appointed Auditor of Freight and Ticket Accounts, vice J. H. Huddleson, resigned.

Pensacola & Memphis.—The new officers of this company are: L. H. Sellers, President; Ed. Watkins, Vice-President; S. C. Cobb, Treasurer; S. N. Van Praag, Secretary; W. B. Wright, Auditor.

Pittsburgh & Lake Erie.—John Newell, of the Lake Shore & Michigan Southern, has been elected General Manager. The position of General Superintendent has been created, and Elliott Holbrook appointed to the office, with full charge of the road.

Pullman's Palace Car Co.—A number of changes in the management of this company in Pittsburgh, Pa., will take place July 15. The resignation of W. F. Crouch, Assistant Superintendent, will take effect on that date, and he will be succeeded by J. C. Gibbons, of Cincinnati. J. F. Richardson, First Assistant to the Superintendent, will be transferred to Cincinnati, and J. B. Gibson, of the latter place, will fill the vacancy in Pittsburgh.

Richmond & St. Louis.—The directors of this new Indiana company are: D. J. Mackey, William Heilman, W. D. Ewing, G. J. Grammer, W. J. Lewis, E. H. Morgan and Edwin Taylor, all of Evansville.

Wabash Western.—Charles M. Hays has been appointed General Manager to succeed the late A. A. Talmage. James F. How has been made Vice-President.

West Shore.—Walter B. Pollock has been appointed Auditor of Freight Accounts and Downer Adams Assistant Auditor, in the places of John W. Horan and George E. Adams, resigned.

OLD AND NEW ROADS.

Alexandria & Washington.—This road, extending from Alexandria, Va., to the south end of Long Bridge, 5 miles, was sold last week, under a decree of the United States Court, to Colonel F. L. Smith and his associates, representing the Pennsylvania Railroad Company, for \$100,000.

Atchison, Topeka & Santa Fe.—The Mulvane extension has been opened for business to Rochester & Nashville, Kan., and the Strong City extension is opened to Abilene, Kan.

The company has agreed to build a branch from the main line of the Chicago extension to Keokuk, Ia., 12 miles.

Tracklaying will begin on the Chicago extension at La Plata, Mo., on July 15. The gangs will work both ways, laying about three-quarters of a mile a day.

Baltimore & Ohio.—The hearing on the motion to dissolve the injunction granted by Chancellor McGill restraining the Baltimore & Ohio from bridging the Arthur Kill was begun in Trenton, N. J., on July 12. The argument for the state was offered by Mr. Barker Gummere. He held that the state was the original proprietor of all lands within its boundaries. Titles to the land under Arthur Kill rested in the state of New Jersey by right of conquest, as it belonged to the King of England prior to the Revolution. The state admitted the power of the general government to regulate the navigation of the waters, but denied power to take exclusive possession of land lying under the water. He proved that the lands described in the bill are part of the lands of the state and within its boundaries. He showed by many acts of the Legislature that New Jersey had ever asserted her political prerogative in the disposing power over the lands of the State under tidal waters. Mr. Gummere said that the state did not complain in the present case because the bridge would obstruct navigation, but because the defendants had taken full possession of the lands. He declared that the act of Congress, which defendants claimed granted their franchise, was purely to obstruct navigation.

In the afternoon A. Q. Keasbey began the argument for the defendants. He quoted a large number of cases relating to some of the aspects of the question of the paramount power of Congress to regulate commerce and all its instrumentalities. The result of them was to establish that the United States have the paramount control of all the navigable waters of the country, for any purpose whatever which has relation to commerce, also that this control extends to authorizing bridges, railways, viaducts, docks, wharves, or any other fixed structures pertaining to commerce over such waters, as well as to prohibiting obstructions to navigation.

It is reported that orders have been given to stop engineering work upon the survey between Philadelphia and New York and upon all new developments between Philadelphia and Baltimore.

Birmingham & Sheffield.—A 13-mile contract has been recently let, and 17 miles more will be placed under contract as soon as the line can be located.

Brooklyn Elevated.—The engineers and firemen on this road went out on strike on July 11. The railroad company said that the cause of this move was owing to the discharge for reasons of economy of several engineers when the summer time-table was adopted. As soon as this policy was known to the men they sent a committee to the office, which conferred with the executive committee. No satisfactory arrangement was made, and when the committee returned to the headquarters of the men the strike was ordered. The chairman of the committee (a strike says that the reason of the present action goes back to the discharge of two engineers a month ago who were charged with running past a signal. Superintendent Martin refused to reinstate the discharged men, although another engineer who committed the same error had been suspended only 15 days. The men say they

have formulated their demand as follows, but whether they have presented them to the managers of the road does not fully appear:

I. That nine hours constitute a day's work, and work over time be paid for by the hour.

II. That all engineers receive \$3.50 a day and firemen \$2.

III. That when a fireman is promoted to be an engineer the next vacant engineer's position be filled by an engineer hired for the purpose.

IV. That the time of engineers and firemen be figured from the hour at which they report for duty, and to ascertain the whereabouts of their engines.

V. That the senior engineers be given the preference of runs and the privilege of changing runs when convenient.

VI. That an engineer completing a day for another engineer excused receive the regular pay per hour.

VII. That extras ordered out for duty be given a half-day's pay if detained for less than four hours and full pay if sent on the road.

VIII. That no employé be suspended or discharged for belonging to a committee of his Brotherhood, and if suspended he receive half pay pending his reinstatement.

Canadian Pacific.—The Jackson Company, of Nashua, N. H., has contracted to ship 100,000 bales of cotton cloth to China, via this road and the steamship line.

The company will sell round-trip tickets during the summer from San Francisco to Montreal and return at \$100, and to Boston or New York and return at \$110. The tickets will be good for six months. The distance between San Francisco and Montreal, by this route is about 3,700 miles, 800 of it being by steamer. This makes the rate per mile about 1.28 cents.

It is reported that the company has made arrangements for running its trains by its own crews into Detroit over the Michigan Central, and that the Wabash and the Baltimore & Ohio will be used as its Chicago connection.

Capay Valley.—Articles of incorporation have been filed to build a new road through Capay Valley in California. The line will extend from Madison, Yolo County, to Rumsey's at the head of Cache Creek, and is designed to eventually run through Lake County.

Carbon, Schuylkill & Western.—Chartered in Pennsylvania. The road is to be built from a point on the southern line of Carbon County, near the northwest corner of Lehigh Township, in Northampton County, and the terminus will be at or near Blairsville, in Indiana County. Branches will be constructed at places in or near Ashland, in Schuylkill County, to Northumberland, in the county of that name, to Phillipsburg, in the County of Centre, and to East Tyrone, in the County of Blair. The length of the road will be about 125 miles. Capital stock of company, \$20,000,000. George A. Stimson, of New York, is said to own the bulk of the stock.

Central Massachusetts.—Good progress is being made on the extension of this road west of Ware, Mass. The rails are now being put in place between Ware and Belchertown.

Chateaugay.—Incorporated in New York. It is to construct a railroad from near Lyon Mountain, from the westerly terminal of the Chateaugay Railway in Dannemora, by the most feasible route through Clinton County and into Franklin County, terminating at or near Saranac Lake Village, a distance of 40 miles. The capital is \$168,000, divided into \$100 shares.

Chicago, Burlington & Quincy.—It is reported that the company has completed the preliminary arrangements for the extension of its line to Fort Worth, Tex., and the construction of the line will soon commence.

Chicago, Jefferson City, Girard & El Paso.—The company has filed a charter in Kansas and will build a road from Jefferson City, Mo., to El Paso, Tex. Headquarters at Girard, Kan. Capital stock, \$8,000,000.

Chicago, Milwaukee & St. Paul.—The company has begun a suit against the Chicago, St. Paul, Minneapolis & Omaha to recover lands and benefits valued at \$25,000,000. A few years ago the St. Paul agreed with the Omaha not to attempt to secure from the State of Wisconsin the possession of a rich land grant now known as the Omaha grant. In return the Omaha agreed in the event of its own success to give a one-fourth grant to the St. Paul, and also to allow it certain track privileges on the line from Chippewa Falls to Superior. The St. Paul now seeks to enforce this contract.

Chicago, Rock Island & Pacific.—The company has completed its extension into Wichita, Kan., and will begin running through trains from Chicago at once.

Chicago, St. Paul & Kansas City.—Shepard Winston & Co., of St. Paul, Minn., have the grading of the southwesterly extension of this road, the "Diagonal," completed from Des Moines to the Missouri River, and work is being begun beyond the river.

Cincinnati, Hamilton & Dayton.—The survey of the proposed extension of this road from Richmond to Jonesborough, Ind., 61 miles, has been completed. Twenty miles of the distance will require very heavy grading.

Clearfield & Allegheny.—Chartered in Pennsylvania. The line will be 125 miles long, and will run through Clearfield, Cambria, Indiana, Westmoreland, and Allegheny counties, starting at a point near Gazzam Station, on the Beech Creek Railroad, in Clearfield County, and extending to Allegheny City. Branches will extend to Sharpesburg and other points in Allegheny County. The capital stock is \$3,000,000. The bulk of the stock is held by George A. Stimson, of New York.

Clearfield & Dubois.—This company has been granted a charter in Pennsylvania. The new road will extend from Clearfield to Dubois, Pa., 15 miles. Principal office, Clearfield. Capital stock, \$150,000.

Cleveland, Akron & Columbus.—The work of constructing the Dresden branch of this road is in progress now night and day. Tracklaying is nearly completed between Killbuck and Warsaw, Ohio, and the work on the tunnel below the latter place is being pushed by a large force. When the road is completed to Dresden, it will develop an extensive coal field in Holmes and Coshocton counties.

Cumberland & Piedmont.—The jury in the Cookery farm condemnation case brought in a verdict last week of \$17,850 damages. The new railroad people thought the verdict excessive and counsel filed exceptions to the same, offering 13 reasons why the award should not be ratified.

Dayton, Fort Wayne & Chicago.—A meeting of stockholders will be held on Aug. 5 to ratify the lease of their line to the Cincinnati, Hamilton & Dayton in perpetuity, the latter company to guarantee the principal and interest of a proposed mortgage of \$5,500,000, to run 50 years at 4½ per cent. This would be at the rate of \$21,000 a mile and is to make extensions and take up floating debt. The Cincinnati, Hamilton & Dayton stockholders will vote on the question Aug. 6.

Denver, Memphis & Atlantic.—During the month

of June track was laid on this road by the Mallory Construction Co., as follows: Chetopa Division, completion of link between Cedawale and Bells Plains, Kan., 7 miles; Conway Springs Division, completion of link between Stafford and Larned, 34 miles; Western Division to Scott City, 42 miles; total, 83 miles.

Denver, Russell Springs & Southwestern.—Articles of incorporation filed in Kansas. The proposed road will extend from Denver, Col., to Russell Springs, Logan County, Kan. Principal office, McPherson, Kan. Capital, \$6,000,000.

Desha & Eureka.—Articles of incorporation filed in Arkansas. The proposed road will run from Pendleton, Desha County, to Eureka Springs. Length of road, 210 miles. Capital stock of company, \$3,150,000.

Fairchild & Mississippi River.—The line is completed from Fairchild to Osseo, Wis., 15 miles.

Fitchburg.—The Westinghouse Incandescent Light Co. and the Brush Arc Light Co. are both making experiments at the present time in the Hoosac Tunnel. The Fitchburg company will select the most successful of the two lights.

Important changes in the time-table of this road, which will add several new trains, are said to be pending.

Fort Plain & Richfield Springs.—Incorporated in New York to build a road from Fort Plain, in Montgomery County, southwest to Richfield Springs, 30 miles. Capital stock, \$600,000.

Fort Scott, Wichita & Western.—A charter has been filed in Kansas by which the St. Louis, Fort Scott & Wichita road is to be known by the above name. The road was sold a short time ago by the U. S. Marshal and was bought in by Jay Gould. The charter filed provides that the purpose of the new company is to buy and operate the St. Louis, Fort Scott & Wichita. This road runs from the city of Fort Scott, Bourbon County, Kansas, through the counties of Allen, Woodson, Greenwood, Butler, Sedgwick, Kingman, Sumner, Harper, Barbour and Comanche to the Cimarron River; also through the counties of Harvey, Marion, McPherson, Rice and Ellsworth to the Kansas Pacific road, an estimated distance in all of 450 miles. The capital stock of the new company is \$7,000,000. Headquarters at Fort Scott and Wichita.

Hartford & Connecticut Western.—It is said that ex-Speaker J. W. Husted is to be the president of this company, and that he will be the head of the syndicate which proposes to build the necessary connections to make a through line, over the Poughkeepsie bridge, between Hartford & Springfield on the east, and the Pennsylvania coal fields on the west.

Housatonic.—The rumor that this road is to be leased to the New York, New Haven & Hartford has been authoritatively denied.

Houston, Central Arkansas & Northern.—Major James Converse, of Houston, Tex., says that the survey of this road will be begun this week and finished within 60 days. It will begin at Pine Bluff, Ark., and run to Monticello, Hamburg, Bastrop, Monroe and Columbia, and from there to Alexandria, a distance of about 215 miles.

Huntingburg, Tell City & Cannelton.—This company has contracted with Scott & Lyle, of New Albany, Ind., for the building of the entire line from Huntingburg, Ind., to Cannelton, 35 miles.

Illinois Central.—The legal fight between this company and the city of Chicago over the appropriation of the lake front by the railroad is up before Justice Harlan and Judge Blodgett in Chicago.

Intercolonial.—A dispatch from Ottawa says that the Dominion Government will not entertain any proposal for the purchase of this road until the effect of the construction of the Short Line through Maine has been ascertained.

International Railroad & Steamship Co.—The Jacksonville & Palatka division of what is known as the "Gordon Road" in Florida was sold under a decree of the United States Court last week. It was sold for \$1,300 to A. B. Mason, who was owed for work to the amount of \$8,753. A charter with valuable grants was given to this road years ago by the Florida Legislature, and on this charter 55 miles of road were graded, but no track was laid.

Kansas City, Memphis & Birmingham.—The company has located a branch from Amory over the main line to Aberdeen, Miss., 12 miles in length. Contract for grading is let to W. J. Condon & Co., Knoxville, Tenn.; contract for pile trestle to R. De T. Lawrence, Marietta, Ga.; and for foundation and masonry of drawbridge at Aberdeen, to Gude & Reilly, Louisville, Ky. Work to be finished in 90 days.

Kentucky Central.—The company have made a mortgage to the Metropolitan Trust Co. of New York for \$7,000,000, to secure an issue of 4 per cent. gold bonds. The mortgage covers the entire property of the company.

Knoxville Southern.—The City Council of Knoxville, Tenn., has decided to subscribe \$275,000 for this road, which is to be built in connection with the Marietta & North Georgia, making a direct line from Knoxville to Atlanta, Ga.

Lake Shore & Michigan Southern.—The company is making many and permanent improvements, cutting down grades and building new iron bridges between Toledo and Chicago, all in reference to double tracks.

Lake Shore, of New Hampshire.—The directors have appointed a committee to locate this road and employ an engineer to make the survey from Laconia, N. H., to Alton Bay.

Long Island.—A mortgage for \$1,250,000 on the North Shore Division of this road has been filed in favor of the Central Trust Co., of New York.

Louisville & St. Louis.—W. S. Hook, President of this company, announces that grading is to begin on the road at once, and that trains will run from Mount Vernon, Ill., to Centalla in 90 days. A meeting will be held in Jacksonville, Ill., on Sept. 20, to vote first mortgage bonds at the rate of \$15,000 per mile.

Macon & Covington.—The road is completed from Macon to Monticello, Ga.

Mariacopa & Phoenix.—This road was completed between Mariacopa and Phoenix, Ariz., on July 2, and regular trains are now running.

Meigs Elevated Railway Construction Co.—This company invites proposals for manufacturing the girders, posts, bar-iron and steel shapes of their girders, posts and rails for 8 miles of structure for its one-rail railroad between Cambridge and Boston. Two miles of the structure is needed as soon as it can be made.

Meriden & Waterbury.—The Railroad Commissioners of Connecticut have approved the lay out of this road, and the company can now go ahead and condemn all land along

the line between Meriden and Waterbury, Conn., which cannot be otherwise obtained. The Commissioners refuse, however, to grant a grade crossing at Baldwin street, in Waterbury, and the road must cross that thoroughfare either above or below the grade.

Mexican National.—Circulars have been issued by President Raoul, of the Mexican National Railroad Co., and by President Palmer, of the Mexican National Railway Co. The first gives notice that the control of the lines heretofore owned or operated by the Mexican National Railway Co., and purchased by the new company at foreclosure sale last May, has now been assumed by the latter company, and that all agents and employees employed by the Mexican National Railway Co. are retained in their respective positions by the new company. The circular of President Palmer is issued in attestation of the other.

Minnesota & Northwestern.—Tracklaying is now in progress between Freeport and Dubuque, and the building of the tunnel is well started. This tunnel will be 2,400 ft. long.

Missouri Pacific.—The contract for the extension from Fort Smith to Little Rock, Ark., has been let to a point within 20 miles of Booneville, and the contract for the entire line will soon be under way. It is expected to have the road finished within a year.

Nevada & Eldorado.—The projectors of this road expect to have it ready for operation in October or November. Frank P. Anderson, the contractor, is at Nevada, Mo., preparing to begin work. The road will extend from Nevada to Eldorado, Mo.

New Haven & Derby.—The New Haven Board of Councilmen voted this week by a vote of 26 to 5 to accept the report of the Board of Finance selling the city's interest in this road to W. H. Starbuck. The contract includes an agreement that the purchaser shall construct an extension to the New York & New England road at Hawleyville, Conn.

Mayor York, of New Haven, has signed the order of the Common Council authorizing the sale. The matter will now be carried to the courts. An injunction to restrain the city from making the transfer has been asked for. The chief ground upon which the injunction will be asked is that the sale will be contrary to the state law prohibiting gifts from citizens to railroads. The claim is made that inasmuch as an extension of the Derby to the New England system is provided for as part of the bargain with Starbuck, and this extension must be built by some railroad company the sale of the city's interest to Starbuck for only \$275,000 is in reality a gift.

New Roads.—A railroad is to be built from Corning, Ark., to Cherokee Bay, Ark. Capt. W. D. Reynolds, of Pochantus, Ark., can give information.

New York, Chicago & St. Louis.—At a meeting in Erie, Pa., the different corporations organized since the foreclosure were consolidated under the above name, this being the original title, with the exception that the word railroad is substituted for railway.

New York, New Haven & Hartford.—At a meeting last week it was determined to add to the rolling stock of this company 100 passenger cars, 20 drawing-room cars and 6 locomotives of the largest size. A committee was appointed to consider the expediency of purchasing a tract of land between Bridgeport and New Haven, for the purpose of establishing thereon all the shops for the construction and maintenance of the rolling stock of the company, and for the purpose of providing cheap houses for the employees engaged in such work.

It is said that the company will do away with between 60 and 70 highway grade crossings on its line this year.

Northern Pacific.—The suit of the Oregon & Transcontinental Co. against the Northern Pacific was last week laid over till the next motion day in the United States Circuit Court at New York. The action is brought to restrain the defendant from building certain branch roads which it is claimed were projected for the purpose of saddling the main line with debt, and thereby defrauding the stockholders. The plaintiff is a large holder of Northern Pacific stock.

Pacific.—The Investigating Commission have been performing their work lately in Kansas City, Mo., and Denver, Colo. In the first city, Judge J. P. Usher, an attorney of the Union Pacific, and the man who drew up the mortgage consolidation of the Union Pacific and Kansas Pacific, was patiently listened to while he answered questions in regard to affairs of the Leavenworth, Pawnee & Western and the consolidated mortgage of which he was the chief engineer. "Legal expenses" found on the books of the Kansas Pacific showed a payment of \$7,500 to the Hon. William E. Chandler, of New Hampshire, for services in 1874 in assisting to get the pro rata bill passed by Congress, and \$5,000 expended in entertaining members of the Legislature at Topeka, Kan. At Denver, Senator Teller, ex-Governor John Evans, Edward Eddy, General Manager of the Omaha and Grant Smelting & Refining Co.; W. A. H. Loveland, a former director of the Union Pacific, and Charles Wheeler, formerly Auditor of the Denver & South Park Railway, gave their opinions and experiences in the matter under discussion.

Among the witnesses examined in Denver on July 13 were J. K. Choate, Superintendent of the Colorado Division of the Union Pacific; J. B. Felker, formerly State Railroad Commissioner for Colorado; Willard Teller, one of the local attorneys of the Union Pacific; Edmund H. Smith, editor of the Denver Evening Telegram, and a number of local merchants.

Pensacola & Memphis.—This road is to be built by the Anglo-Southern Construction & Improvement Co., and it is said work will begin within 60 days. The line is intended to run from Grenada, Miss., southeast to Meridian, and thence to Pensacola, Fla.

Philadelphia & Reading.—Special Master Dallas has filed his audit of the account of the Receivers of this company for the month of June. The company's account showed a balance brought forward on June 1 of \$136,836, to which were added the receipts from freight and tolls on coal, merchandise, etc., \$1,643,131; amount received from reorganization trustees to retire Receivers' certificates, \$2,825,000; and other sundry receipts for the month, making a total of \$4,830,724. From this \$2,000,000 was deducted for Receivers' certificates, which had been given for wages, retired; \$124,852 paid out for materials and supplies; \$613,371 for wages and salaries and sundry other disbursements, giving a total of \$4,561,496 and leaving a balance of \$269,228 on hand July 1.

The Coal and Iron Company's account showed a balance brought forward on May 31 of \$122,315, to which was added the receipts from coal sales, \$1,029,104, and the sundry receipts for the month, making a total together of \$1,327,166. From this \$571,028 was deducted for wages and salaries, \$123,448 for materials and supplies, \$125,715 Receivers' certificates, which had been given for supplies, retired, and various other disbursements, making a total of \$1,218,168, and leaving a balance of \$109,997 on hand on June 30.

Pittsburgh & Lake Erie.—The machine shops of this company at Chartiers, Pa., were burned last week. The loss was about \$50,000.

Pittsburgh & Western.—This company has just laid a narrow gauge track across Mill street in Youngstown, O. The citizens called upon the Solicitor and the police force to stop the construction, but the track went down and a train went over it. Several years ago the Painesville & Youngstown graded up to the street, but an injunction kept them on one side of it. The Pittsburgh & Western has held the franchise on the narrow gauge up to the street by running an engine over it every day. It will now be made standard gauge, and be extended through the city, connecting with the present main line at or near Hazleton, 2 miles east of Youngstown.

Powell's Valley.—The city of Knoxville, Tenn., will subscribe \$225,000 for this road, which is to be built from Knoxville to Cumberland Gap, and connect with the Louisville & Nashville and Norfolk & Western roads in Kentucky.

Ohio & Mississippi.—The company has awarded a contract for 900 cars, 500 box, 300 flat and 100 stock, to the Michigan Car Co., of Detroit, to be delivered at the rate of 25 a day, beginning about Sept. 1. The cars will be of 50,000 lbs. capacity.

Old Colony.—The Fall River line now runs two steamers daily each way, the same as last summer. General Passenger Agent Geo. L. Connor, in announcing that this line continues to be one of the wonders of the world, modestly says: "The old country, whose continual boast is of institutions long since finished and development which will admit of no further increase, has no parallel of this transportation line to present, and it proves invariably one of the revelations which the new world has for the old, when the self-satisfied representative of some European nation chances, in his touring, to make the trip between New York and Boston by this means."

The Canadian Pacific, notwithstanding the favor it is sure of from Englishmen, must look out for its laurels; and, on the other hand, Mr. Connor must not excite the American Eagle to such an extent as to cause a reaction in favor of routes that do not taunt Europeans with their littleness.

Omaha, Dighton & Southwest.—Articles of incorporation have been filed in Kansas. The purpose is to build a line from the north line of Republic County southward through Cloud, Mitchell, Osborne, Russell, Ellis, Trego, Ness, Lane, Finney, Haskell, Grant, Stephens and Seward counties. Capital stock, \$1,000,000.

Orange Belt.—It is reported that this road from Monroe to Orange City, Fla., 135 miles, will be completed and ready for operation by Nov. 1.

Oregon & California.—Track is laid to the summit of the Siskiyou Mountains in California. The entire grading force of more than 3000 men is now employed on the north side of the mountain, and the grade is being pushed with great rapidity. Between the northern line of California and Ashland, Oregon, there are to be four tunnels. The contracts are let for three of them. The company will build the fourth. The general opinion is that the entire road will be completed by the last of November. From the north end of the tunnel at the summit of the Siskiyou the line runs along the side of the hill for three miles. Then it enters Conger Gulch tunnel, and there turns completely around, and goes back on its former course on a line just below it. In one place the two lines are only 27 ft. apart. After running on this line for three miles, it again reverses and takes a new course parallel to its former line to Oviette Gap, and from there makes a comparatively straight line to Ashland. The maximum grade on the line is 172 ft. per mile and the maximum curve 14 degrees.

Richmond & St. Louis.—Articles of incorporation filed in Indiana. The object is to build a road from Elkhart, Daviess County, to the Illinois state line. Capital stock, \$500,000.

St. Louis, Arkansas & Texas.—Track-laying has been completed into Sherman, Tex., and work is about to begin on the passenger and freight depots, roundhouses, etc., in that city.

St. Louis, Ottumwa & Cedar Rapids.—In the case of George S. Coe and William Nichols against this company, whose road is a branch of the Wabash Western, running from Coatesville, Mo., to Ottumwa, La., a decree of foreclosure of the first mortgage of \$320,500, made Oct. 1st, 1875. A master in chancery has been appointed to sell the road.

St. Louis & San Francisco.—This company has bought the Fort Smith & Southern Railroad, 13 miles long, for \$45,000.

St. Paul, Minneapolis & Manitoba.—Tracklayers on the Montana extension have reached Poplar River, 210 miles west of Minot, Dak. For 230 miles west of this point, as far as Fort Assinaboine, the grade is practically completed. This is 440 miles west of Minot and within 108 miles of Great Falls in Montana. Shepard, Winston & Co., the contractors, have also just completed the grading of the Moorehead & Wahpeton 40 mile branch of this road. Work is also in progress on the branch from Park River to Langdon, Dak., the grading being about half done. Work on the extension from Benson to Watertown is also going forward rapidly. Since Jan. 1 this company had laid, up to last week, 353 miles of new track.

St. Paul, Mississippi, Faribault & Northwestern.—Incorporated in Minnesota. The proposed road is to be built from some point in the southeastern part of Minnesota northwestward, via Faribault, to some point on the western boundary of the state, intersecting the St. Paul, Minneapolis & Manitoba at or near Wilmar. Capital stock, \$6,000,000.

San Antonio & Aransas Pass.—The company has laid 150 miles of new track since Jan. 1 of this year. This gives 321 miles of track now in operation, all built since August 17, 1885.

San Francisco & North Pacific.—A contract has been signed to grade the extension of this road from Cloverdale to Ukiah, Cal. The contract calls for the completion of the work by August of next year. It is the heaviest piece of grading in the state, the contract providing for nearly 4,000 ft. of tunneling.

Southern Pacific.—The company is reported to have contracted with Eastern firms for new cars, which will require an outlay of \$750,000. The Pullman Palace Car Co. is to build 29 sleeping cars for about \$319,000, or \$11,000 per car; 28 first-class coaches, at a cost of \$4,500 per car, are to be built at Dayton, Ohio. In addition to this equipment for the passenger service, 6 baggage and express cars will be built in the company's shops at Sacramento. Another firm in Dayton, together with one in Richmond, Va., have contracts from the company for 300 twenty-five-ton flat cars and 300 box cars of the same capacity. The former will cost \$235,000 and the latter \$180,000. When the new sleeping cars are completed, the company will have in use 80 west of El Paso, and with the new freight cars will have 17,000 freight cars on the whole system.

The company has taken possession of the main line and branches of the South Pacific Coast Railroad. The management announces that there will be no radical departure in

operating the roads. There is talk of placing the narrow gauge line across the mountains between San Jose and Santa Cruz, Cal., in the department known as the Northern Division, of which Mr. Bassett is Superintendent, and the road from San Jose to San Francisco will probably go into J. A. Fillmore's department.

South Pennsylvania.—The committee appointed in New York several months ago by the bondholders of this company to take steps for completing their line from Harrisburg to Pittsburgh, Pa., have about completed their duties, and the case will be called up in the Supreme Court during the September term, upon a motion to make the injunction a permanent one. It was decided against the Pennsylvania Railroad Co. upon the motion for a preliminary injunction, the Court deciding that the transfer of the property to the Pennsylvania would be illegal. Should the case again be decided against the Pennsylvania Railroad, two other projected lines to Pittsburgh will be abandoned, as the South Pennsylvania will certainly be built.

Tennessee Midland.—Proposals will be received by R. H. Temple, Chief Engineer, at the office of the Virginia Construction Co., Cotton Exchange Building, Memphis, Tenn., until July 25, for the graduation, masonry, bridging, trestles and ties for that part of the Tennessee Midland lying between Memphis, Tenn., and the Tennessee River, being about 135 miles in length.

Trinidad.—Denver parties have assumed management of and put in operation a road between Trinidad Colo., and the Denver & Rio Grande, completing a gap of 5 miles, which has been left unfinished for the last 10 years.

Trumbull & Mahoning.—Work is to begin on this road in the early fall. The road will run from a connection with the Pittsburgh, Painesville & Fairport at Niles, Ohio, south into Columbiana County, where it will traverse valuable coal fields.

Utah & Northern.—The line from Pocatello, Idaho, to Silver Bow Junction, Montana, is to be changed to standard gauge.

Vermont & New Hampshire.—A bill has been introduced in the New Hampshire Legislature to incorporate a railroad company of this name. The bill authorizes the company to build a road from any point on the west bank of the Connecticut River in the counties of Sullivan and Cheshire through any towns in the counties of Sullivan, Cheshire and Hillsboro to any points in the last two named counties, or to connect with any railroads in said counties. The company is authorized to lease its road to the Central Vermont.

Western & Atlantic.—Senator Joseph E. Brown, President of the lessees of this road, has petitioned the Legislature of the state of Georgia, which owns the road, for \$3,000,000 for betterments made by the lessees. He alleges that when he took possession of the road it had only 600 inferior cars, while now it has 1,400 latest style cars. This proportion holds good in other departments. The intimation was that if the state did not pay for the betterments they would be removed. Ex-Congressman William H. Fulton, who is a member of the Legislature, at once moved that the Governor be instructed to serve an injunction upon Mr. Brown, and that attachments be served upon all the appurtenances of the road in every county through which it passes. A somewhat similar bill was introduced by Mr. Huff. They were referred to the Finance Committee, and will be reported back.

Wheeling & Lake Erie.—There is a report from Cleveland that the extension of this road from Bowerston to present terminus at Wheeling, W. Va., will be begun at once and actively pushed.

Wisconsin Central.—The owners of the Wisconsin Central properties do not contemplate a consolidation, but a new company which will purchase the securities of the Wisconsin Central, Wisconsin & Minnesota, Penokee & Minnesota and the St. Croix & Wisconsin roads. There are 600 miles of road, and the securities to be issued are \$12,000,000 5 per cent. first-mortgage bonds, \$9,000,000 5 per cent. income, \$3,000,000 6 per cent. cumulative preferred stock, and \$10,000,000 of common. The first series of bonds are to be exchanged for first-mortgage bonds, second series for incomes, dollar for dollar; one-half of the preferred stock for new preferred stock, dollar for dollar, and the other half at 50 cents, the same to be paid for with incomes at 75 cents. Old common stock is to be taken at 40 cents, to be paid for in new common stock at 75. The fixed charges under the new arrangement will be \$1,230,000 per annum, or \$2,050 per mile.

Worcester & Hudson.—At a meeting of the directors of this recently incorporated company, whose line is to be built from Worcester and Hudson, Mass., 18½ miles, it was reported that bonds for deeds had been secured for half the land needed for the line. The town of Shrewsbury does not come to time with its subscription to the stock, and President Gilman announces that if this timidity is continued the town of Marlboro will be placed on the line instead of its neighbor. At Marlboro, the new road would connect with the Central Massachusetts.

TRAFFIC AND EARNINGS.

Coal.

The coal tonnages for the week ending July 9 are reported as below:

	1887.	1886.	Inc. or Dec.	P. c.
Anthracite	619,293	569,032	I. 110,261	21.6
Bituminous	250,247	285,698	D. 35,451	12.4
Coke (July 2)	35,379	82,590	D. 47,151	57.1

Cumberland coal shipments for the week ending July 9 were 46,507 tons, and for the year to that date, 1,598,669 tons, an increase of 711,155 tons over last year.

The coal movement on the Pennsylvania road for the week ending July 2 was:

	Coal.	Coke.	Total.	1887.
Line of road	197,343	35,479	232,722	240,083
Year to July 2	5,232,354	1,053,793	6,286,052	7,252,342

Decrease for the week 7,361 tons, or 3.0 per cent.; decrease for the year 366,290 tons, or 5.0 per cent.

Cotton.

The cotton movement for the week ending July 8 is reported as below, in bales:

	1887.	1886.	Inc. or Dec.	P. c.
Interior markets	1,726	3,827	D. 2,101	62.2
Receipts	5,375	13,160	D. 7,785	59.1
Shipments	38,253	77,661	D. 39,408	50.7

	1887.	1886.	Inc. or Dec.	P. c.
Seaports	1,261	12,694	D. 1,433	11.2
Receipts	18,162	39,387	D. 21,225	53.9
Exports	249,312	307,633	D. 58,321	18.0

Total movement from plantations for the crop year ending July 8 was 6,345,458 bales, against 6,451,765 last year, 5,597,605 in 1884-85, and 5,643,264 in 1883-84.

The Inter-state Commission.

A letter from the New York Board of Trade and Transportation by Frank S. Garner, acting secretary, has been received by the Inter-state Commerce Commission, announcing the purpose of the Board to appear before the Commission

and make an argument in reference to the classification of freight by the trunk lines, and especially regarding the much higher charges imposed by the new classification on less than car-load shipments as compared with car-loads, which, the letter says, virtually perpetuates under the guise of classification the unjust discrimination effected by means of rebates and drawbacks to large shippers under the old system. The Board is, however, informed that the trunk lines now have under consideration material modifications of the first classification adopted by them, and until it is seen what modifications are voluntarily made, it will be difficult, the letter says, to argue the question intelligently. If the information can be obtained in time, the Board wishes to be heard July 15 in connection with the St. Louis Wholesale Grocers' Association, among whose complaints against the Missouri Pacific this matter figures. If the data be not in hand by that time, the Board asks that further time be given for the consideration of this matter.

The first case before the Inter-state Commerce Commission to be adjusted by the refunding of an alleged overcharge is that of Mrs. J. H. Stahl, of Walla Walla, Washington Territory, against the Oregon Railway & Navigation Co. Mrs. Stahl's letter of complaint was a queerly worded and rather plaintive document in which she described in German-English phraseology her business troubles, mentioning the fact that she is a widow. Commissioner Bragg forwarded the complaint to the railroad company requesting an investigation, and if it was found that an overcharge had been made, that the money be refunded. The company's attorneys have filed their reply to the effect that the beer kegs over which the complaint arose were shipped from Milwaukee; that the rates were fixed by a company over which respondent has no control, and that the said rates were not unreasonable or unjust. Notwithstanding this, however, the respondent says it has fully satisfied complainant in respect to all matters connected with said shipment of beer kegs. Mrs. Stahl's receipt for \$20, in full settlement and complete satisfaction for overcharge, is inclosed, and her complaint is withdrawn.

Answers have been received by the commission from the Oregon Railway & Navigation Co. to the complaints of William H. Reed and Milton Evans, of Walla Walla, W. T. These cases are said to practically involve the interests of a large wheat-growing region. The complaints are in substance that the charge of \$6 a ton for the transportation of grain from Walla Walla to Portland is excessive and unreasonable. The company sets forth that its line between Portland and Walla Walla is constructed through a rugged region, with practically no intermediate traffic, that its operating expenses are greatly in excess of the average expenses of other lines, and that it is frequently blockaded by snow-storms and earth slides, which subject it to extraordinary expenditures. The whole traffic, freight and passenger, between Portland and Walla Walla, inclusive, amounted during the eleven months ended May 31, 1887, to \$606,405, and the operating expenses for the same period amounted to \$792,490.

East-bound Shipments.

The total shipments of all freight except live stock from Chicago eastward through to seaboard points amounted last week to 32,365 tons, against 42,808 tons for the week previous, a decrease of 10,443 tons. The following statement shows the percentages carried by each road: Baltimore & Ohio, 9.0; Chicago & Grand Trunk, 10.4; Chicago, St. Louis & Pittsburgh, 18.9; Lake Shore & Michigan Southern, 18.1; Michigan Central, 18.9; New York, Chicago & St. Louis, 5.5; Pittsburgh, Fort Wayne & Chicago, 27.9; Cincinnati, Indianapolis, St. Louis & Chicago, 1.3.

A New Elevator at Buffalo.

Land has been bought and a 2,500,000 bushel elevator will be built next to the Dakota elevator, which is also to be enlarged this season to the same capacity. The new elevator will be known as the Minnesota.

Special Baggage Service.

The rates charged by the New York Central and allied lines for the special baggage service recently referred to are as follows: In each of the following cities, per piece, 25 cents: Buffalo, Detroit, Cleveland and Indianapolis. In St. Louis, Cincinnati and Chicago, 50 cents for the first piece, 25 for each additional. In Boston, Saratoga and New York, 50 cents each piece. All these prices are for points within regular delivery limits; for a longer distance more is charged. A single piece checked from residence in New York to residence in Saratoga would therefore be \$1; between Boston and Indianapolis, 75 cents; between Cleveland and Indianapolis, 50 cents.

Revising Freight Rates in Illinois.

The Railroad and Warehouse Commissioners of Illinois have completed their work of revising the classification of freight on the roads of the state. The maximum rates on coal were reduced. A reduction of five cents on each haul was made from present rates down to the seventy-ninth haul. From that to the 210-mile haul a reduction of three cents was made, and after that a sliding scale of reduction is made to the 500-mile haul, running from seven to 39 cents. No opinion has been written on the demand of the milk shippers for a lower rate to Chicago, but it has been decided not to make any change. The settlement of the dispute between the railroads and live stock shippers left no complaint before the board, and no change in live-stock freight rates was made.

Trunk Line Classification.

The Trunk Line freight classification which since April 1 has been used by many roads for local as well as through business, has been revised, the new issue to go into effect July 15. There are numerous changes, most of them being reductions, though household goods, burlaps and railroad ties are among the articles placed in a higher class. The only concession to the New York complainants concerning carload rates seems to be the reduction of canned goods, in less than car-loads, from third to fourth class.

The question as to what articles shall be included in "cotton piece goods" and what class they shall go in is still unsettled, some of the members of the classification committee being in favor of granting more of the merchants' demands than are the majority and the matter will be put to a letter ballot.

The Wabash and the 4th Section.

Receiver McNulta, of the Wabash Railway, has decided to ignore Section 4 of the Inter-state Commerce law, in so far as it applies to traffic over his lines from Peoria or Chicago to the East.

Michigan Central Tourist Tickets Cause Trouble.

There is trouble among the Chicago lines over the action of the Michigan Central, in cutting the rates to Boston \$4, by means of a round trip tourist ticket to Fabyans, in the White Mountains, thus making the cost of a round trip ticket from Chicago to Boston and return \$40. It is said the Michigan Central will have to withdraw the rate, or all the roads with Boston connections will drop first class fare to Boston to \$20.

The National Water Ways.

A meeting of those interested in the improvement of the national water ways will be held at Sault Ste. Marie, Mich., Wednesday, July 20, for the purpose of memorializing Con-

gress and selecting representatives to visit Washington the coming winter and present to the River and Harbor Committee of the House, and Committee on Commerce of the Senate, statistics with accompanying maps showing the necessity and reasons for larger appropriations to the new lock and Hay lake channel of St. Mary's River, and such other national works as may be deemed advisable.

Reduced Fares to a St. Louis Committee.

One of the most important actions taken by railroad passenger men at Niagara Falls on July 12 was on an application of the people of St. Louis for a special rate from St. Louis to Washington and return for a committee of citizens. The ground of the request was that the people of St. Louis wish President Cleveland to visit their city at all events, and will therefore send a committee to personally solicit him. Without much discussion the request was granted, and the rate fixed at \$21.25 for the round trip for each person. The matter was kept very quiet.

Freight Rate War in Texas.

The Texas railroads are just now engaged in an animated war of freight rates. For some time there have been differences among the lines forming the Texas Traffic Association in regard to the rates out of St. Louis, Kansas City and other Missouri points to Texas points, and, in fact, it has been published in the St. Louis and New Orleans papers that the Atchison, Topeka & Santa Fe was the refractory member that refused to come to terms. The Houston & Texas Central, in anticipation of the cut, has issued rates which, taking effect July 14, will be 20 per cent. less than the last cut.

The Fourth Section in the South.

The representatives of the roads in the territory south of the Ohio River, and between the Mississippi River and the Mobile & Ohio Railroad had a meeting in St. Louis this week, and formally decided that any line might, when made necessary by water competition, make competitive rates regardless of the fourth section of the Inter-state law. Some of the tariff rates were also advanced. The question of an organization with a commissioner was discussed but not settled.

Central Traffic Association.

The Central Traffic Association held its monthly meeting at the Clifton House, Niagara Falls, on July 12. The most important action taken was the abolition of the rule regarding party rates. On and after Aug. 1 all excess baggage must be reported to lines in interest on the basis of division of the ticket rate. The question as to whether for meetings other than on the certificate plan, the rule should be to make the rate a fare and one-third for the round trip was left to lines in interest. The matter of making rates for the meeting of Patriarchs Militant in Denver in September was referred to the Trunk line committee. The rule authorizing half rates for inmates of National homes for disabled soldiers was extended to apply to state homes and soldiers and sailors' orphan homes. A rule as to through service was amended so as to leave to the discretion of General Passenger Agents additional charges for intermediate stops. It was decided to make extension rate sheets take the place of local rate sheets, and a committee of seven was appointed to consider the problem and report at the next meeting, on Aug. 9, at Mackinac Island.

Wheat Rates from Missouri River Points.

Members of the Southwestern lines met in Chicago on July 12 for the purpose of discussing the demand of the Chicago & Alton for a reduction of grain and other rates from Kansas City and Missouri River points to Chicago. The discussion resulted in a reduction of the rate on wheat 2½ cents per 100 lbs., leaving the corn rates as at present. There was also a demand that the dressed beef rates be reduced from 40 cents to 30.25 cents, as from Omaha, but action was deferred.

New Steamship Company.

Articles of incorporation of the New York & Mobile Steamship Co. were filed in New York last week. The company is organized for the purpose of running passenger and freight steamers between New York and Mobile, stopping at Philadelphia, Baltimore, Norfolk, Savannah, Pensacola, Key West and Havana.

The Railroads and the Lake Carriers.

Ten railroad companies, parties to the Southwestern Statistical Bureau, Western and Northwestern Railway Freight Bureau, and the Colorado-Utah Freight Bureau, have, through their chairman, issued the following notice:

"Owing to the misconceptions which have arisen, and for the purpose of securing, in the future, definite and complete understanding regarding the rules prevailing, notice is hereby given that on and after July 12, 1887, and until further notice, all traffic arriving at or forwarded from Chicago via the lake, originating at, destined to, or passing through Missouri River points, Kansas City and Sioux City inclusive, will be subject, west of Chicago, to the regular established local rates as per published tariffs. All parties interested will please take notice, and be governed accordingly."

Central Traffic Association.

The Freight Committee adopted the following resolutions in regard to commodity tariffs:

WHEREAS, It is the opinion of this committee that it is impracticable to abolish commodity tariffs, therefore,

Resolved, That such tariffs should be limited to as few articles as possible, and should apply to local as well as competitive tariffs. That the mileage form of commodity tariffs is objectionable as leading to unnecessary reduction in rates, and consequent loss of revenue.

Resolved, That whenever it is found necessary to issue a commodity tariff on any article or articles, the places to and from which the rates apply be specifically stated, with a provisional clause protecting intermediate points.

Resolved, That no commodity tariffs shall be issued without the sanction of the general freight agents' committee of this association, and no reduction shall be made in them without the proposed reduction first being referred to said committee for its sanction.

Resolved, That the chairman of this association be furnished with a sufficient number of each commodity tariff, to keep a complete file in his office, and to supply one copy to each member of the association.

Resolved, That commodity tariffs can be advanced or withdrawn at the option of the road issuing them on notice to the chairman, who shall notify all roads interested.

Resolved, That roads on which mileage commodity tariffs are now in effect be requested to withdraw the same and substitute therefor commodity tariffs of a form provided for herein.

Resolved, That all roads in this association be requested to abolish as many of their commodity tariffs, now in effect, as possible, and that of such as they find necessary to continue they send a sufficient number of copies to the chairman for distribution among the members of the association.

The question of equalizing export rates was referred to the general managers. The committee recommended certain changes in the statistics to be furnished by the association. It also recommended that rates and divisions on trans-continental traffic to and from Central Traffic Association territory be placed on a percentage basis of New York rates.